RAILTEL CORPORATION OF INDIA LIMITED
(A Govt. of India Undertaking)
(CIN: U64202DL2000GOI107905)

LIMITED TENDER DOCUMENT

FOR

Tender for "Supply and Installation, Testing & Commissioning of 100 Gbps Channel over existing DWDM and creation of New DWDM Network"

Two Packet-Technical & Commercial Bid
-Price Bid

E-Tender No. RailTel/LT/CO/NTP/2019-20/DWDM/510
Dated 09.01.2020

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RailTel Corporation of India Limited

A Government of India (Ministry of Railways) Undertaking

Plate-A, 6th Floor, Office Block Tower-2, East Kidwai Nagar, New Delhi-110023

LIMITED TENDER NOTICE

RailTel/LT/CO/NTP/2019-20/DWDM/510 Dated: 09.01.2020

RailTel Corporation of India Ltd. invites Limited Sealed Tenders in Single Packet (Technical Bid and Price Bid) System for **"Supply and Installation, Testing & Commissioning of 100 Gbps Channel over existing DWDM and creation of New DWDM Network "**.

The details are as under: -

a)	Start Date for the Tender	09.01.2020
b)	Closing date for Submission of Bids	Upto 15:00 hrs of 17.01.2020
c)	Date of opening of Bids	15:30 hrs of 17.01.2020
d)	Earnest Money Deposit (EMD) #	Rs. 7,52,500/- *
e)	Cost of Tender Document	Rs. 5,900/-*
f)	Estimated Cost	Approx. Rs. 12.05 Cr/-
* These will be payable by Bank Draft in favor of RailTel Corporation of India Limited, New Delhi		

Eligible MSEs/NSIC are exempted from cost of Tender Documents and EMD, more details are given in clause 22.7, chapter-4.

Note:

The bidder shall bear all costs associated with the preparation, submission/participation in the bid. Purchaser in no way will be responsible or liable for these costs regardless of the conduct or outcome of the bidding process.

(Harish Pawaria)
General Manager/NTP
For RailTel Corporation of India Ltd

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CHAPTER-1

OFFER LETTER

RailTel Corporation of India Ltd.
Plate-A, 6th Floor,
Office Block Tower-2,
East Kidwai Nagar,
New Delhi-110023

Ref: RailTel/LT/CO/NTP/2019-20/DWDM/510

1. I/We _____ have read the various conditions detailed in tender documents attached here to and hereby agree to ABIDE BY THE SAID CONDITIONS. I/We also agree to keep this offer open for acceptance for a period of **60 days** from the date of submission and in default thereof. I/We will be liable for forfeiture of my/our Earnest Money. I/We offer to supply various equipment at the rates quoted in the attached schedules and hereby bind myself/ourselves to complete the work within **60 days** from the date of issue of Purchase Order/LOA. I/We also hereby agree to abide by the Various Conditions of Contract and to carry out the supplies according to the Specifications for materials and works laid down by the RailTel.

2. A sum of **Rs. 7,52,500/- (Rs. Seven Lacs Fifty Two Thousand Five Hundred Only) as an Account Payee Demand Draft in favor of RailTel Corporation India Ltd. No._____ dated____ issued by _____**is herewith forwarded as "Earnest Money". The full value of Earnest Money shall stand forfeited without prejudice to any other rights or remedies if, I/We withdraw or modify the offer within validity period or do not deposit the security deposit (Performance Bank Guarantee) within **specified days as per tender** after issue of Purchase Order/LOA.

SIGNATURE OF SUPPLIER (S)

Date:

CONTTRACTOR (S) ADDRESS

SIGNATURE OF WITNESS:

1.

2.

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CHAPTER- 2

SCHEDULE OF REQUIREMENT

SN	Description of Item	Unit	Qty.	Unit Rate in Fig (in Rs.)	Total Cost in Fig. (in Rs.)	Unit Rate in words (in Rs.)	Total Cost in words (in Rs)
-1	-2	-3	-4	-5	-6	-7	-8
A	SCHEDULE OF SUPPLIES						
A1	Supply of DWDM system for providing 2x100G channel DWDM system (Chennai to Kolkata) as per technical specifications as defined in chapter 3 of tender.	Lot	1				
A2	Spares @ 8% of supply against item 1 above.	Lot.	1				
A3	NMS						
(a)	Supply of NMS to support the specified numbers of NEs as per tender specifications. (Software)	Lot	1				
(b)	Supply of NMS to support the specified numbers of NEs as per tender specifications. (Hardware)	Lot	1				
A4	Supply of Local/Craft Service Terminal Hardware and Software as per technical specifications of tender document complete with all accessories compatible with NMS as per specification in clause 3.3 of Chapter 3C	Nos.	2				
	Total Cost of Schedule of Supplies (A)						

SN	Description of Item	Unit	Qty.	Unit Rate in Fig. (in Rs.)	Total Cost in Fig. (in Rs.)	Unit Rate in words (in Rs.)	Total Cost in words (in Rs.)
-1	-2	-3	-4	-5	-6	-7	-8
B	SECHEDULE OF SERVICES						
B1	Design & Installation, Testing, Commissioning and Integration of 100G channel over RailTel existing DWDM network through DWDM system as supplied against Item No. A1 of Schedule of Supplies.	Lot	1				
B2	Design & Installation, Testing, Commissioning and Integration of NMS. as supplied against items A 3 above.	Lot	1				

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B3	Training of personnel over and above the on- site training, during the installation, maintenance and supervision period as detailed in the tender document.	Man weeks	10				
B4	Cost per Engineer for level II support during Warranty Period for two years.	Nos	1				
B5	Incremental AMC charges after warranty period as percentage of overall cost (including taxes and duties) of Schedule of Supplies(A) over and above 3.5%. Only incremental % cost in addition to 3.5 % mentioned in clause 3 of Chapter-4 required to fulfill Long Term Maintenance support clause . (E.g. if the annual AMC cost is proposed to be 4% the quoted % should be (+) 0.5 % per annum under column 5 & 7 . For five years it should separately be shown as (+) 2.5 % under column 6 & 8. For clarity, detailed scope of AMC be read in clause 3 of Chapter-4	years	5				
	Total Cost of Schedule of Services (B)						
	Total Value of Schedule of Supplies (A) & Schedule of Services (B)						
	Total Value of SOR in Words:						

Note-I	
I	a) Unit rate quoted against SOR above should be CIP destination inclusive of all duties, taxes, insurance and freight etc. (with break-up as per Performa attached as Annexure-A, B and C of this Chapter). The materials as per SOR are required to be delivered within the delivery period as indicated in Bid Data Sheet (BDS, Chapter 5) to the sites as decided by the CO/Respective Regional GM/EDs. b) It shall be the responsibility of Tenderer to transport the equipment to site for the Installation & Commissioning. Charges for the same should be included in SOR Item no. B 1 (Design and Installation, Testing & Commissioning). Materials not installed / not to be installed need to be shipped to location as decided by CO/RGM/Executive Director of the Region. c) The Schedule of Requirement has been divided into two parts, viz. (A) Schedule of Supplies including item nos. A1 to A4 and (B) Schedule of Services including item nos. B (1) to B (5). d) Tender will be evaluated based on the price quote for 8 x 100G as per Note-II 1A. However, order will be placed for 2 x 100G as per Note-II 1B. Bidder shall submit two separate Schedules for Note II 1A and Note II 1B as per the format on Page 6 & 7 of Chapter-IIfor both configurations mentioned in Note-II.

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II	Tenderer to give the detailed Bill of Material including break up costs of common units/cards/module/chassis/Transponder/Muxponder/Patch Cords/ROADM/Fan Tray unit etc. for building up the SOR items A1 and A2 of Schedule of Supply (A). In absence of same, the bid shall be summarily rejected.
III	Tenderer shall attach Unit Rate Analysis of item nos. A1 and A2 of the Schedule of Supply (A), i.e. cost of each sub-assembly, card, module, Transponder, Muxponder, Patch Cords, ROADM etc., in their Price Bid. The quoted Unit Rates should correspond to the referred Rate Analysis. In absence of same, the bid shall be summarily rejected
IV	Tenderers should submit the configuration of each equipment indicating quantities of various modules/ sub modules/ cards/ sub racks including the vacant slots in the sub racks/ chassis for expansion.
V	The cost of 8% of each type of part-items included in item nos. A 1 of the Schedule of Supply (A) should be quoted in SOR item no. A 2 of Schedule of Supply (A) by the tenderer.
VI	In item no. B5 of Schedule of Services (B), if the tenderer feels that his AMC Cost is less than 3.5% per annum, he should give suitable discount in equipment/supply item pricing. For AMC he will be paid @ 3.5% per annum only. If the vendor quotes a higher base rate for AMC he will be paid at his quoted rate per annum and five year differential cost shall be added to equipment cost for evaluation.
VII	Bidder shall quote the rate of Hardware and Software separately for SOR item no. A 3 (NMS). 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.
VIII	The NMS components shall be as follows: a) First location: One main NMS server. b) Second location: Disaster Recovery (DR) server c) Two (2 clients) – to be distributed as may be decided by RailTel. Total no. of equipment = 2 servers (Main+ DR) + 2 clients with the required software licenses.
IX	In SOR item no. B4 (Cost per Engineer for level II support), tenderer has to quote unit cost of One Engineer during Warranty Period (i.e. cost of one engineer for two years) at main NMS Location.
X	Tenderer should submit the hard copy of the offer along with soft copy in PDF format. The bid has two parts, technical & Financial and should be submitted separately. Bill of Material (BOM) must be in PDF as well as Excel format."
XI	The Bill of Material will be prepared for Schedule of Requirement against each item of SOR. This Bill of Material will be called "Bill of Material for Schedule of Requirement" and will comprised of duly filled rates of each item. And will be prepared according to Note (I) to (X) above. The Un priced copy of the same BOM should be submitted with the technical/credential Bid for evaluation. The Bid (credential without the BOM will be summarily rejected). The Format of "Bill of Material for Schedule of Requirement" is as below:

			Qty required as per Note-II	Qty required as per Note-II	SOR A1	SOR A2	SOR A3(a)	SOR A3(b)	SOR A4	SOR B1	SOR B2	SOR B3	SOR B4	SOR B5
SN	Item	Unit	Qty	Qty										
1	(to be provided by bidder)													

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		2	(to be provided by bidder)													

XII	Bidder/OEM can also leverage existing DWDM hardware/ Management system of 100G DWDM system deployed in RailTel in proposal. In case if the cards/modules/Licenses in the existing hardware is proposed, OEM shall provide Undertaking for long term support for 8 years for all existing components irrespective of End of Life of the existing hardware. Existing traffic shall not be impacted during the deployment of the new DWDM system. Hardware required for such up gradation shall be included in price bid as per Page No.6 & 7 of Chapter-II
XIII	Bidder/OEM can also leverage existing L2 resource at Secunderabad/Kolkata if applicable.
XIV	Participation in this tender through Authorized partner is permitted subject to the following conditions: 1. The partner shall submit required documentary proofs to establish the tender following eligibility criteria. i. The tenderer should present at least one (1) project worth at least 35% of tendered value showcasing Supply, installation, testing, commissioning, and maintenance of DWDM Infrastructure Solution commercially in India during last preceding 3 financial years (i.e. current year plus three previous financial years). Copy of work orders supported with relevant documentary evidences for the same and the completion certificates by the client. Documentary evidence should clearly indicate the nature of systems implemented for each project. ii) The sum total of the turnover (i.e. revenue from operations) during the last preceding 3 financial years (i.e. current year plus three previous financial years) from the date of opening of tender should be Minimum 150% of the tendered value. 2. Hardcopy sent to the Original tenderer shall be used for participating in the bid. 3. Partner shall submit tender specific back to back agreement with OEM to discharge all liabilities pertaining to this tender. 4. OEM shall give a unconditional tender specific authorization for extending warranty support and AMC incase if partner fails to perform the same. 5. Participant OEM or their authorized partner is allowed to participate in the tender. 6. OEM can authorized only one partner to participate in the tender.

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Note –II Tender evaluation criteria	
1	A) Backbone Segment: Tender will be evaluated with capacity of 8x100G (Client side) from Chennai to Kolkata in Backbone (ROADM, Amplifier, Mux/Demux shall be capable of 4 Tbps in Backbone in new DWDM backbone section) Metro segments: 1. Chennai RailTel- TCL Chennai : 2x100G 2. Kolkata- Bidhan Nagar (1 x 100G + 10 x 10G support) 3. Bidhan Nagar-TCL Kolkata: 2 x 100G Tenderer should submit the soft and Hard copy (Word/Excel/PDFs format) of Bill of Material (BOM) with price of each item required for the same with total cost inclusive of all. B) Order will be placed for 2x100G from Chennai to Kolkata in Backbone & Metro segments as furnished below as per scope of work defined in Chapter-3. 1. Chennai RailTel- TCL Chennai : 1x100G 2. Kolkata- Bidhan Nagar (1 x 100G + 10 x 10G support) 3. Bidhan Nagar-TCL Kolkata: 1 x 100G The Bidder shall submit the BOM with price of each item as per the requirement furnished above including of all Taxes. Note: The price quoted by bidder should be in line with the orderable quantity. Conditional price and Conditional bill of material is not acceptable. The offered solution (Module & Product) of evaluation BOM Should be similar to orderable BOM and also should comply technical specification given in the tender document.
2	The Equipment offered by the OEM or equipment of the same series/family should have satisfactorily working in India for 100G deployment of DWDM system for minimum length of 500Kms for at least 12 months as on date of opening of tender. The certificates from the actual users will have to be submitted along with bid.
3	Equipment offered by the OEM or equipment of the same series/family should have been satisfactorily working in India for 100G Alien wavelength deployment in live network over 3rd party DWDM network for minimum length of 500Kms for at least 12 months as on date of opening of tender. Documentary evidence should be submitted with offer. This clause will not be applicable for Adva Equipment since ADVA Equipment is being used in existing DWDM Network of RailTel.

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Annexure-A

Price Schedule for Indigenous Items

SN	Description	Total Qty	EX - Factory Price (Basic Unit Price exclusive of all levies and charges)	Pkg & Forwarding Charges		CGST, IGST, SGST & GST		Frieght & Insurance Charges		Other Charges and Levies (to be specified by bidder)	Price Per Unit (all inclusive) for delivery at destination (4+6+8+10+11)
				%	Amt	%	Amt	%	Amt		
1	2	3	4	5	6	7	8	9	10	11	12

Annexure-B

Price Schedule for Imported Equipment

S N	Descr iption	Total Qty	Ex-Factory Price (Basic Unit Price exclusive of all levies and charges)	Unit Price per Unit CIF	Custom Duty		CGST, IGST, SGST & GST		Pkg & Inland Frieght		Inland Insurance		Other Charges and Levies (to be specified by bidder)	Price Per Unit (all inclusive) for delivery at destination (4B+6+8+10 +12+13)
					%	Amt	%	Amt	%	Amt	%	Amt		
1	2	3	4A	4B	5	6	7	8	9	10	11	12	13	14

Annexure-C

Price Schedule for Service Items

SN	Item Description	Total Qty	Basic Unit Price exclusive of all levies and	CGST, IGST, SGST & GST		Other Charges and Levies, if any (to	Unit price (all inclusive)
				%	Amt	Amt	(4+6+7)
1	2	3	4	5	6	7	8

(End of Chapter 2)

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CHAPTER-3

A. TECHNICAL REQUIREMENTS AND SPECIFICATIONS FOR DWDM SYSTEM

1.1 Introduction

RailTel is implementing optical fiber based broadband telecom long haul network with new generation optical networking systems. The desired network should accommodate the growing demand for bandwidth, while maintaining compatibility and enhanced flexibility to transport and route all traffic types including Dense Wave Division Multiplexer (DWDM), Time Division Multiplexing (TDM) and Internet Protocol (IP) data.

At present RailTel has deployed 40/80 Channel (100/50GHz) DWDM network with 10G & 100G line system between Kolkata- Chennai and covering other Important Cities like, Hyderabad, Bengaluru, Vijayawada, Bhubaneshwar, Kharagpur, Wardha, Nagpur, Raipur etc. The Network is created using ADVA make DWDM FSP3000 series.

RailTel desires to create 100G network between Kolkata to Chennai by using mix of Alien wavelength over ADVA's make coherent DWDM segment & new DWDM system using new fiber pairs on remaining segment.

Network between **Chennai** to **Vijayawada** in Path#1 & **Chennai to Nagpur** (Via Bangalore-Guntakal-Wadi-Secunderabad-Wardha-Nagpur) in Path#2 as per network topology depicted in section 1.2.1 shall be Alien wavelength solution over ADVA DWDM system.

Network between **Vijayawada** to **Kolkata (Via Vishakhapatnam-Vizianagaram-Bhubaneshwar-Kharagpur-Kolkata)** & **Nagpur** to **Kolkata (Via Vizianagaram-Raipur -Bilaspur-Jharsuguda-Rourkela-Kharagpur-Asansol- Kolkata)** as per topology Depicted in section 1.2.1 shall be new DWDM network using new fiber pairs. The required network shall be Dense Wave Division Multiplexing (DWDM) based system and End of Life (EoL) shall not be less than 8 Years and capacity shall be 4 Tbps in Backbone. The system must be programmable and highly intelligent, with very basic, robust and simple architecture.

Proposed 100G solution for Alien wavelength shall work seamlessly with existing 100G channels without impacting traffic and shall mitigate any non-linear penalty introduced by existing 100G DWDM system.

The technical specification given in this part describes functional as well as performance requirements of the proposed telecom network.

The DWDM system shall meet the requirements of both metro and long-haul networks.

1.2 OVERVIEW OF THE SCOPE OF WORK

The scope of work would be System Design, Supply of Equipment at various sites/locations of RailTel as per the existing DWDM network configuration and the fibre characteristics at 1.2.1 including Customer sites in RailTel's Kolkata - Chennai

Section. The scope also includes installation, testing, Commissioning & Acceptance of the DWDM Network including integration with the existing NoC. The scope of work shall include, but not be limited to the following:

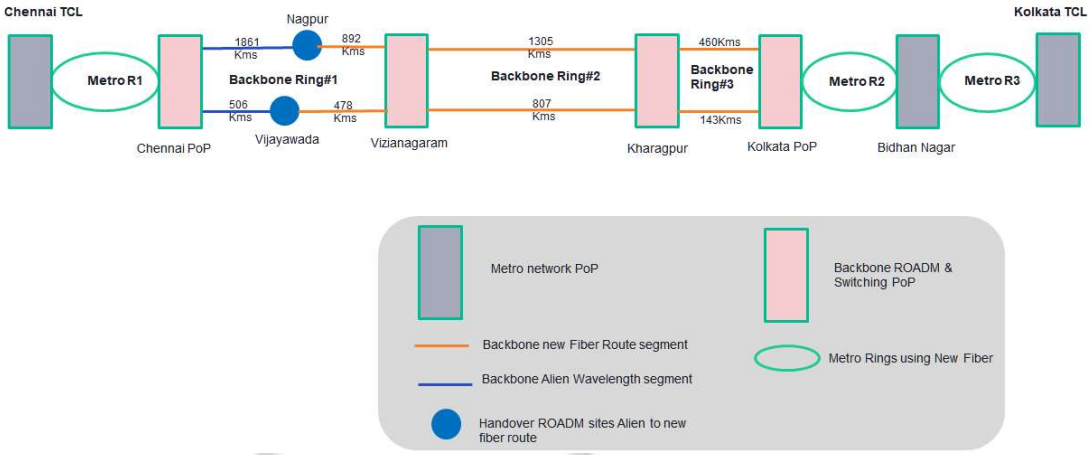
Project Management, Supply of all related goods and providing all related services including custom clearance if required, transportation, installation, testing, commissioning & AT of the telecom system and training of RailTel personnel.

1.2.1 DESIGN OF NETWORK

a. RailTel invites solution for following segment of their DWDM network
   1. Chennai Metro network using Dark Fiber
   2. Chennai-Kolkata backbone DWDM Network using
      i. Alien Wavelength segment &
      ii. New DWDM segment
   3. Kolkata Metro (two rings) using Dark Fiber with 1x100G channel

   Metro R2 : Kolkata- Bidhan Nagar (1 x 100G + 10 x 10G support)
   Metro R3 : Bidhan Nagar-TCL Kolkata: 1 x 100G

b. Following is the proposed network topology for DWDM link engineering & solution design.



1. Bidder must propose optimized solution based on above topology for Backbone & Metro segments.
2. Traffic shall be 1+1 protected in each of Backbone & metro rings i.e. traffic shall be up for any single fiber cut combinations across rings.
3. Following photonic component deployed in RailTel network and shall be considered for design
   a) OADM & ILA-OADM sites are equipped with ROADM 8x1 & 4x1 for 100G Coherent Photonics with 50 GHz channel spacing
   b) OADM sites equipped with 80 Channel Mux/Demux (minimum) with 50 GHz channel spacing.
   c) ILA sites equipped with Mid Stage Amplifier with East Direction and West direction.
   d) Chennai to Vijayawada in Path#1 & Chennai to Nagpur in Path#2 is nx100G DCM free network.
   e) The proposed Alien 100G transponder shall be coherent technology based & link performance shall meet BER at 1E-15 without external DCM requirement.
   f) Existing network is running 100G channel based on DP-QSPK modulation
   g) Existing working channel matrix is as below.

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Sr. No.	Segment Details	Optical Line System	No. of 10G Channels	No. of 100G Channels
1	Chennai PoP – Vijayawada	80 Ch.	0	8
2	Vijayawada - Vishakhapatnam	40 Ch.	19	0
3	Vishakhapatnam - Vizianagaram	40 Ch.	17	0
4	Vizianagaram – Behrampur	40 Ch.	16	0
5	Behrampur – Bhubneswar	40 Ch.	15	0
6	Bhubneswar - Kharagpur	40 Ch.	17	0
7	Kharagpur - Kolkatta	40 Ch.	22	0
8	Chennai PoP - Bangalore	80 Ch.	0	3
9	Bangalore - Guntakal	80 Ch.	0	4
10	Guntakal - Wadi	80 Ch.	0	3
11	Wadi - Secundrabad	80 Ch.	0	3
12	Secundrabad - Wardha	80 Ch.	0	7
13	Wardha - Nagpur	80 Ch.	0	3
14	Nagpur - Raipur	40 Ch.	21	0
15	Raipur - Bilaspur	40 Ch.	18	0
16	Bilaspur - Jharsuguda	40 Ch.	16	0
17	Jharsuguda - Rourkela	40 Ch.	20	0
18	Rourkela - Kharagpur	40 Ch.	16	0
19	Kharagpur - Asansol	40 Ch.	14	0
20	Asansol - Durgapur	40 Ch.	6	0
21	Durgapur - Kolkatta	40 Ch.	10	0
22	Raipur - Titlagarh	40 Ch.	8	0
23	Titlagarh - Vizianagaram	40 Ch.	8	0

4. Existing Node details

##	Node Name	Node Type
1	Chennai PoP	ROADM
2	Gummidipoondi	ILA
3	Sullupeta	ILA
4	Gudur	ILA
5	Nellore	ILA-ROADM
6	Kavali	ILA
7	Ongole	ILA
8	Bapatla	ILA
9	Vijayawada	ROADM
10	Eluru	ILA
11	Tadepaligudem	ILA
12	Rajahmundry	ILA
13	Samalkot	ILA
14	Tuni	ILA
15	Anakapalli	ILA
16	Vishakhapatnam	ROADM
17	Vijaynagram	ROADM
18	Srikakulam Road	ILA

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##	Node Name	Node Type
19	Palasa	ILA
20	Behrampur	ROADM
21	Balugaon	ILA
22	Khurda Rd.	ILA
23	Bhuvaneshwar	ROADM
24	Cuttak	ILA
25	Jajpur	ILA
26	Bhadrak	ILA
27	Balasore	ILA
28	Jaleshwar	ILA
29	Kharagpur Jn.	ROADM
30	Panskura	ILA
31	Bagnan	ILA
32	Kolkatta	ROADM
33	Chennai PoP	ROADM
34	Thiruvallur	ILA
35	Arakkonam	ILA
36	Katpadi	ILA
37	Jolarpet	ILA
38	Kuppam	ILA
39	Bangarpet	ILA
40	Whitefield	ILA
41	Bangalore	ROADM
42	Yelhanka	ILA
43	Dodballapur	ILA
44	Hindupur	ILA
45	Penukonda	ILA
46	Dharmavaram	ILA
47	Anantapur	ILA
48	Gooty	ILA
49	Guntakal	ROADM
51	Adoni	ILA
52	Raichur	ILA
53	Yadgir	ILA
54	Wadi	ROADM
55	Tandur	ILA
56	Vikarabad	ILA
57	Secundrabad	ROADM
58	Bhongir	ILA
59	Jangaon	ILA
60	Kazipet	ILA
61	Jamikunta	ILA-ROADM
62	Ramagundam	ILA
63	Sirpurkagaznagar	ILA
64	Ballharsha	ILA

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##	Node Name	Node Type
65	Warora	ILA
66	Wardha	ROADM
67	Nagpur	ROADM
68	Chacher	ILA
69	Tumsar Road	ILA
70	Gondia	ROADM
71	Salkesa	ILA
72	Rajnandgaon	ILA
73	Durg	ILA
74	Raipur	ROADM
75	Hathband	ILA
76	Bilaspur	ROADM
77	Champa	ILA
78	Raigarh	ILA
79	Jharsiguda	ROADM
80	Sagra	ILA
81	Rourkela	ROADM
82	Manoharpur	ILA
83	Chakradharpur	ILA
84	Tata Nagar	ILA
85	Dalbumgarh	ILA
86	Kharagpur Jn.	ROADM
87	Bishnupur	ILA
88	Adra	ILA
89	Asansol	ROADM
90	Durgapur	ROADM
91	Khana	ILA
92	Jaugram	ILA
93	Kolkatta	ROADM
102	Raipur	ROADM
103	Mahasamund	ILA
104	Nawapada Rd	ILA
105	Titilagarh	ROADM
106	Muniguda	ILA
107	Rayagada	ILA
108	Bobbili	ILA
109	Vijaynagram	ROADM
137	Chennai Customer PoP	Terminal
138	Bidhan Nagar	Terminal
139	Kolkatta Customer PoP	Terminal

c. Alien wavelength solution must be designed without impacting existing channel however few tuning (Amplifier Gain, tilt.) allowed for optimization and shall not require truck roll.

d. RailTel will provide Rack Space, power (DC) for equipment Installation & Commissioning.

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e. Vendor must ensure that proposed 100G wavelength in Alien wavelength section must co-exist with existing channel in same fiber pair without any extra ILA.

f. The additional locations can be used as optional ILA locations. List of additional location is placed at **Annexure-Y**.

g. Following are characters of existing Amplifier and which shall be considered for design.

1. Booster Amplifier:
    i. Gain: upto 20dB
    ii. Output Power: 20.5dB
2. Pre-Amplifier
    i. Gain: 20 to 35dB
    ii. Output Power: 20.8dB

Bidder shall consider following fiber losses with 1 dB additional fiber repair margin per span for Alien Wavelength design & 6 dB fiber repair margin for new DWDM system in Backbone. Bidder is also required to submit full link budget calculation along with input parameters Vs output of planning tool. **Fiber Characteristic – Forward and reverse path for the existing ELA and OADM Locations are placed as Annexure-X.**

1.2.2 Bidder should propose solution in New DWDM system with following minimum OADM sites.

1. Vijayawada.
2. Vijaynagram
3. Bhubaneswar
4. Kharagpur
5. Kolkata
6. Asansol
7. Rourkela.
8. Bilaspur.
9. Raipur.
10. Titlagarh.
11. Nagpur.

1.3 New DWDM System (Network between Vijayawada to Kolkata & Nagpur to Kolkata)

1. Next Generation (NG) new DWDM system shall be based on state of art Modern technology which drives high capacity cost effectively and lowers operational cost. NG DWDM system shall operate at discrete wavelengths in the C-band centered around 193.1 THz frequency as per ITU-T Rec.G.694.1 grid. The NG DWDM system shall support transmission of single carrier channel with Software Configurable 100G & 200G line rate as per link budget requirement. DWDM Line Port shall be tunable to 100G/200G through software only to run different line rates to cover different application on the same card with no changes to any of the common equipment at the optical or photonic layer provided meeting link budget.DWDM link in Next Generation Optical Network shall be designed for 4 Tbps Capacity with End of Life (EoL) not less than 8 years.

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The NG DWDM system shall be designed for use in transport networks as a protocol transparent solution for a variety of client/services.

2. Bidder shall propose minimum 4-degree WSS at ROADM sites in Backbone segment depicted in 1.2.1.
3. Bidder shall consider OEQ (Optical equalizations) & regenerator sites as per long-haul design requirement in backbone segment.
4. Bidder shall propose same type of WSS module for all the sites i.e. ROADM, OEQ & Regenerator site for operational spare simplicity & in future any OEQ & Regenerator site shall be easily converted into the ROADM site with incremental hardware only.
5. Booster amplifier and pre amplifier shall be integral part of DWDM terminals, ILAs and OADMs/ ROADMs
6. The system shall support out of band FEC as per ITU-T Rec. G.709
7. Deleted
8. The optical fiber shall be ITU-T.G.652D single mode optical fiber
9. Optical monitoring as per ITU-T Rec.G.697 should be supported at all nodes through EMS.
10. The system shall support one Optical Supervisory Channel (OSC) as specified by ITU-T Rec.G.692 for the monitoring and configuration of OTM, ILA, OADM and ROADM on the route and shall be manageable from one location for the entire route via the EMS or LCT of the equipment. The OSC transmitter and receiver behavior at the Inline Amplifier/ Booster / Pre-Amp shall be monitored through EMS via suitable alarms.
11. The WSS system shall provide software controlled Variable Optical Attenuators (VOA). The optical power per channel must be adjusted automatically, without using external measurement equipment. The adjustment arising out of adding/removing channels has to be done without manual adjustment and shall be possible without affecting other channels; it shall either be triggered by a software command or automated.
12. The optical amplifiers must implement the following mechanisms to maintain error free system operation under dynamic conditions
13. The equipment shall have the provision for monitoring the performance of individual channel through overhead byte of OTUCn. Also, in the case Ethernet support, there shall be the provision of analysis of Ethernet frames.
14. There shall be the provisioning of power and wavelength monitoring points for external monitoring of power and wavelengths at the input/output points of the Booster Amplifier, ILA and Pre-amplifier. These points shall be suitably connectorized and connecting the measurement devices shall not affect the transmission of the main path. Power splitter modules with a ratio of 95%/5% shall be available to use them where needed.
15. The optical window of operation of the DWDM shall be C-Band.
16. Channel spacing: The nominal central wavelength spacing shall be 50GHz or 100GHz. Any consecutive 80 or 40 wavelengths may be chosen by purchaser from DWDM- grid as specified in ITU-T Rec. G.694.1. If bidder opts to offers 100GHz solution, it must support higher channel rate from 100G to 200G using single carrier on same DWDM Port.
17. For the optical connectors used on the equipment side the 'Optical Return Loss' of these connectors shall better than 50 dB
18. DWDM Line port shall be provided with tunable laser covering the complete C-band for 80/40 discrete wavelengths at 50/100 GHz spacing for fast provisioning of transparent end-to- end services and spare part reduction.
19. The equipment shall be housed in the standard 19/21" width sub-racks or ETSI standard or 23" racks
20. The system shall comply to laser hazard class 1M or better
21. The network based on the DWDM System should easily evolve from a point-to-point unprotected system to a DWDM ring or mesh network. Migration and expansion shall not

cause any interruption or change of service, nor modify the operational concept or network management.

22. It shall be possible to equip the system progressively, in accordance to the number of channels transmitted, in order to allow real "pay as you grow" configurations

23. Equipment Protection

24. System should have automatically switched equipment protection for

a. Power Supply protection
b. The failure of controller card should either be non-traffic affecting or automatically switched and protected
c. Total time taken for Fault detection and Switching from active to standby module should be less than 50 ms. There shall no interruption be absolutely to traffic

25. Optical Amplifier (Booster amplifier/Pre-amplifier/ILA) characteristic.

a. They shall be EDFA amplifier.
b. The technical requirements of parametric values, as per ITU-T.692, G.957, G.959.1 and other relevant ITU-T recs
c. The Optical Amplifiers shall be of 'Mid-Access' type with due implementation for gain-flatness, feed-back gain-control & channel-power balancing etc. The Optical amplifiers have to work on 80 @ 50GHz or 40GHz @ 100GHz channels from day one.
d. Sudden addition/removal of channels at intermediate site must not affect whole transmission of DWDM signals. The optical amplifiers shall respond automatically to changes in the number of channels without the need for manual intervention or realignment.
e. The system shall restore autonomously on the restoration of link after fiber plant breakdown or a faulty amplifier. The optical amplifiers must implement the following mechanisms to maintain error free system operation under dynamic conditions:
f. Fast gain control loop: to protect against short term transient conditions such sudden loss of channels.
g. The above requirement shall hold for the optical amplifiers that are part of ROADM, Mux & Demux also

26. Power Supply

a. Nominal power supply is -48 V DC. The equipment shall work in the range -40 V Dc to -60 V DC.
b. The equipment shall be protected in case of voltage variation beyond the range specified in sub clause (a) above and also against reverse input polarity.
c. The derived DC voltages in the equipment shall have protection against over- voltage, short circuit and overload.
d. The equipment shall have the option of operating from two independent sources of input power supply.

27. Performance Requirements:

a. The equipment shall support the following performance parameters relating to the ODU-k as specified in ITU-T Recs.G.8201 and G.7710
b. Optical Channel Transport Unit Background Block Error (OTU_ BBE).
c. Optical Channel Transport Unit Errored Second (OTU_ ES).
d. Optical Channel Transport Unit Severely Errored Second (OTU_ SES).
e. Optical Channel Transport Unit Incoming Alignment Errored Second (OTU_IAES).
f. Optical Channel Data Unit Path Monitoring Background Block Error (ODU_PM_BBE).
g. Optical Channel Data Unit Path Monitoring Errored Second (ODU_PM_ES)
h. Optical Channel Data Unit Path Monitoring Severely Errored Second (ODU_PM_SES).

28. Optical Channel Data Unit Path Monitoring Unavailable Second (ODU_PM_UAS).

29. Alarms:

The following DWDM related alarm conditions shall be reported by the EMS

a. Input power failure of the Transponder/Mux-ponder interface (including Ethernet interfaces).
b. Input power failure of the Amplifiers
c. Output power failure of the Amplifiers
d. Fan/s failure
e. Input channel failure at Optical Add/Drop Multiplex equipment
f. Hardware mismatch alarm
g. Low input power at Transponder
h. Low input power at OA, Optical Add/Drop multiplex equipment

These alarms shall be categorized as Critical, Major, Minor or Warning

The following ODU-k related alarms listed in ITU-T G.798 shall be reported by the equipment through the EMS

a. OTU-k Loss of Frame alarm (OTU -LOF).
b. OTU-k Loss of Multiframe alarm (OTU -LOM).
c. Open Connection Indication alarm (OCI).
d. OTU-k Degrade Defect alarm.
e. OTU-k-Loss of Clock alarm
f. OTU-k Backward Defect Indication alarm (OTU-BDI).
g. OTU-k Payload Mismatch alarm.
h. ODU-k AIS alarm at path layers
i. ODU-k Backward Defect Indication alarm (ODU-kp BDI) at path.
j. ODU-k Locked Defect alarm at path layers.
k. ODU-k signal degrade alarm (ODU-kp DEG)
l. ODU-k loss of frame and multi frame. ODU-LOFLOM)
m. ODU-k Trace Identifier Mismatch alarm (ODU-k TIM) at path level.
n. ODU-k Payload mismatch alarm at path level (ODU-kp PLM)

Optical Add/Drop Multiplex equipment characteristics

a. To support "East-West separation (EWS) i.e. the add/drop channel traversing the east direction shall not share common cards with add/drop channels in west direction
b. ROADM node shall provide an integrated two-stage EDFA optical amplifier to offset various losses i.e., insertion loss for channel add/drop and fibre-attenuation etc. Upgrades to additional add/drop channels upto limits proposed, shall be hitless and shall be supported in field.
c. They shall be dual fiber
d. Reconfigurable optical add-drop multiplexer (ROADM) is a form of optical add-drop multiplexer that adds the ability to remotely configure wavelength in OADM system. This allows individual wavelengths carrying traffic channels to be added and dropped from a transport fiber without the need to convert the signals on all the WDM channels to electronic signals and back to optical signals.
e. Bidder shall propose minimum 4-degree directional ROADM for Backbone segment.
f. ROADM shall allow for remote configuration and reconfiguration
g. ROADMs shall allow automatic power balancing.

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h. ROADM shall provide add/drop of 100G, 200G channel as offered bidder (0 to 40 channels for 100G Channel based solution or 0 to 20 Channels for 200G rates-based solution)
i. The planning of entire bandwidth assignment need not be carried during initial deployment of a system. The configuration can be done as and when required.
j. ROADM shall allow for remote configuration and reconfiguration
k. In ROADM, as it is not clear beforehand where a signal can be potentially routed, there is a necessity of power balancing of these signals. ROADMs shall allow automatic power balancing.
l. The ROADM shall be compact in size and shall be of low power consumption and low insertion loss type
m. It shall provide Express channel equalization.
n. It shall be highly reliable
o. Each side of an ROADM node is to be split logically and physically, ensuring that there are no single points of failure that would cause both east and west add/drop traffic to be lost.
p. The WSS based ROADM must support "drop and continue" Power leveling of add wavelengths without the need for additional equipment required and ROADM solutions must provide the capability to add/drop all wavelengths running per degree if configured accordingly

30. The following client interfaces or combinations thereof shall be supported on proposed client interface in Backbone
1) 100GE
2) OTU4

31. DWDM Line port shall support Post FEC BER 10-15 for all 100G & 200G rates.

32. Metro network shall be designed based on following criteria
a. 8 Channel Mux/Demux
b. Fiber loss: as per above table.
c. Total connector Loss: 1dB
d. Fiber Repair Margin: 3dB

33. 100G channel must be protected within ring against fiber cut. Traffic must survive against single fiber cut in each ring independently or simultaneously. The switching time must be less than 50 ms.

34. Protection switching shall be triggered based on Loss of Signal and Pre-FEC BER signal failure.

35. In Kolkata Metro part (Kolkata PoP & Vidhan Nagar) shall be Alien wavelength solution over Corient DWDM system. In case Bidder wants to quote New DWDM System, in that case Bidder needs to quote 10x10G protected (1+1) lambdas as well between Kolkata PoP & Vidhan Nagar.Client Plugs for 10G shall support 1550/1310nm.

36. Backbone solution shall be based on OTN DXC or similar/equivalent system to support additional 3rd Path in future using incremental hardware only to support additional 3rd Path in future using incremental hardware only.

37. Proposed DWDM system shall be managed by single unified NMS system for all the active component.

38. 100G Transponder & DWDM port shall provide following performance monitoring to health of circuit

a. Transmit Power
b. Receive Power
c. Wavelength (nm) or Frequency (THz)
d. Error Second
e. Severe Error Second
f. Code Violation or Background Block Error
g. Unavailable Second
h. PreFEC BER
i. Q Value

39. 100G Transponder shall provide following client protocol

a. 100GE
b. OTU4

40. QUALITY ASSURANCE PROGRAM AND IMPLEMENTION METHODOLOGY

The tenderer with quality assurance should prepare Implementation Methodology covering:

a) Schedule of Factory Acceptance Test (FAT), supply, installation, SAT (Site Acceptance Test), trial runs, commissioning etc.
b) Allocation of manpower for different activities.
c) Submission of PERT chart indicating completion of various activities within targeted time frame.

41. MANUFACTURING, SUPPLY AND STORAGE OF EQUIPMENT

The tenderer will be fully responsible for Manufacturing, FAT, Supply of Equipment/cards/interfaces and all related items for installation and commissioning of the network including the following:

a. DWDM based equipment with required interfaces as specified in this tender document.
b. Integration with existing DWDM/SDH/MPLS Transmission Network as required.
c. Supply of Patch cords: The tenderer is required to supply patch cords of suitable interfaces/ length for connection with FDF and client interfaces.
d. Maintenance spares- maintenance spares, if purchased by RailTel, are not to be used till expiry of warranty period.
e. Spares required for Commissioning, maintenance supervision & warranty period shall be maintained by the Contractor at his own cost.
f. All necessary cables and connectors required.
g. The tenderer shall be responsible for transportation and storage of Equipment and all other items required for Installation and Commissioning of the network to RailTel's stores/sites as advised.

42. SITE PREPARATION

42.1 RailTel' s Responsibility

Following shall be arranged by RailTel: -

42.1.1 Space/Buildings /equipment room for housing rack / space in rack for location of equipment.
42.1.2 –48 Volt DC power supply required for equipment.
42.1.3 Earthing of value less than 1ohm required for equipment.
42.1.4 Spare Fiber as applicable.
42.1.5 For the ILA and OADM Locations RailTel will provide space in Rack up to 8 RU on standard 19" Telecom Rack. In case the offered ILA and OADM is required more space in that case bidder shall provide the Rack

- 48 Volt DC Power Supply will be made available by RailTel at locations adjacent/near to the Equipment. Earthing will be made available on Earthing bus- bar on the wall in equipment room. Racks (for new DWDM layer), DCDB, MCBs, power cables (approx. 15 mtr per site) required for extending power from Power distribution point shall be provided by the bidder.

42.2 TENDERER's Responsibility

The tenderer will be responsible for supply, installation & supervision of complete work for this tender including the System design of network and integration with the existing network, wherever required. It shall be the responsibility of Supplier to transport the equipment to site for the Installation & Commissioning. List of sites/nodes will be shared by CO/respective Regions with the successful tenderer.

42.2.1 OUTSIDE PLANT ACCEPTANCE

The tenderer should check and ascertain that the 48V DC/ 230V AC power supply and Earthing arrangement (value less than one ohm) existing at the respective nodes meet the requirement of equipment proposed to be installed. Augmentation required if any may be clearly brought out by tenderer, at the time of installation.

42.2.2 INSTALLATION, INTEGRATION, TESTING, TRIAL RUN AND COMMISSIONING OF NETWORK

The tenderer shall be fully responsible for Quality Assurance of equipment & other network elements and supervision of following:-

1. Installation and integration of the above said equipment/ items as per System design
2. Integration with existing network
3. Testing of the Network as specified in the document
4. Trial run of the network
5. Commissioning of Network

42.2.3 TRAINING OF PURCHASER'S PERSONNEL

Training on the OFC equipment and network operation shall be provided by the Tenderer as per details given in the schedule of requirement and the tender document.

42.3.4 FINAL COMMISIONING

The DWDM Network shall be considered to be commissioned only after successful completion of the SAT, Trial Run, successful completion of 12 months of Maintenance Supervision after issue of PAC and after issue of Final Acceptance Certificate (FAC).

Any item of Tenderer's goods/services not specifically mentioned, but considered essential for completion/commissioning of the work in all respects shall be deemed to be included in the scope of work. The tenderer may bring out any additional requirement and quote the price for the same as per the relevant SOR item, otherwise, it shall be required to be supplied by the tenderer free of cost.

42.3 GENERAL SYSTEM GUIDELINES

a) Tenderer shall be responsible for the successful completion of the project.
b) Purchaser/Engineer reserves the right to modify, revise, and alter the specifications of equipment system prior to acceptance of any offer.
c) If during the course of execution of the work any discrepancy or inconsistency, error or omission in any of the provisions of the contract is discovered, the same shall be referred to the Purchaser/Engineer who shall give his decision in the matter and issue instructions directing the manner in which the work is to be carried out. The decision of the Purchaser/Engineer shall be final and conclusive and the Tenderer shall carry out the work in accordance thereof.

42.4 TECHNICAL RESPONSE

The technical response shall be fully comprehensive and detailed and will include detailed guaranteed specifications of the equipment and systems to be supplied. Marginal performance shall not be accepted.

42.5 FEATURES AND CAPABILITIES OF EQUIPMENT

The succeeding specifications contain the necessary requirements of RailTel with regard to the features and capabilities of the equipment to be offered by the Tenderers. These will be carefully studied and commented upon by the Tenderer. These should not be treated as maximum specifications.

42.6 COMPLIANCE TO TECHNICAL REQUIREMENTS

42.6.1 CLAUSE BY CLAUSE COMPLIANCE

In the offer, the Tenderer shall include statement of clause by clause compliance of the tender document and sufficient documentation such that RailTel can validate the compliance statements.

In addition to the above mentioned compliance statements, wherever statement is given for some numerical parameter specified in tender, then Tenderer shall state the actual numerical value of specification as met by the offered systems/equipment.

42.6.2 NIL OR UNCLEAR RESPONSE STATEMENTS

In case of nil or unclear statements of compliance for any specified requirement, RailTel will interpret that particular requirement as being "NON COMPLIANT."

42.6.3 VARIANCE FROM SPECIFIED REQUIREMENTS

In case of variance of the offered equipment from the specified Technical requirements, the decision of RailTel on whether the equipment offered is responsive to the bid requirements shall be final and binding upon the Tenderer.

42.6.4 DETAILED TECHNICAL INFORMATION

The Tenderer shall include in his proposal the detailed Technical information, drawings and functional descriptions of the offered equipment to support the Compliance to DWDM Technical Specifications as in Chapter-8A of this tender document.

(End of Chapter 3A)

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CHAPTER-3

B. NETWORK REQUIREMENTS AND EQUIPMENT CHARACTERISTICS

1 PROPOSED DWDM NETWORK

RailTel desires to create 100G network between Kolkata to Chennai. The required network would be Dense Wave Division Multiplexing (DWDM) based system. The system must be highly intelligent, with very basic, robust and simple architecture.

The details of functionality required are given in following clauses of this chapter.

2 PRESENT OPTICAL FIBRE NETWORK

At present, DWDM network has been installed/ under installation in about 25,000 RKMs. DWDM networks on different sections/nodes of RailTel including customer sites across India. The fibres installed conform to RDSO specifications IRS: TC 55-2000 or earlier versions with G.652/G.652D fibers.

a. VARIETY OF NEEDS

The network should meet customer connectivity needs of 100G service. The network will also provide connectivity to Ethernet services. The Ethernet transport should be able to carry IP & MPLS traffic transparently.

b. RELIABILITY/AVAILABILITY

System availability should be greater than 99.999% excluding logistics, fibre and power supply. System BER shall not exceed $1*10^{-15}$ for 100G & above rates as per ITU-T. Vendor should submit the theoretical calculations in support of the above for all the links in this project with 3 hour MTTR, if called for.

3 SYNCHRONIZATION: If the proposed network requires any synchronization bidder may include the same in offer.

4 SYSTEM REQUIREMENT:
It shall be possible to equip the system progressively, in accordance to the number of channels transmitted, in order to allow real “pay as you grow” configurations.

The system shall support Optical Terminal Multiplexers (OTM), Optical Line Amplifier (OLA) and Optical Add and Drop Multiplexers (OADM). The DWDM system shall support a wide range of network topologies as per following: -

a) Terminal configuration Point-to-point.

b) Point-to-point with linear OADM add-drop chains.

c) DWDM ring with OADMs. The system shall support true optical ring closure without the need for regeneration via OEO conversion.

d) DWDM meshed networks using optical interconnection nodes.

e) The protection switching should be achieved in less than 50 ms.

f) Modules which increase the system's application range shall be an integral part of the system (i.e. they shall fit into the same shelves, reuse the same basic modules, etc.).

5 OPTICAL BUDGET

5.1 The bidder shall specify the optical power budget, launched power, receiver sensitivity and other related features of the DWDM interfaces and aggregates. Any limitations in optical engineering calculations in case of DWDM ring configuration shall be indicated.

5.2 The DWDM System shall provide built-in "plug & play" type of Optical Power Equalization/Pre- amplifiers, if any, to meet individual channel power difference (channel power balancing) and individual channel OSNR requirements etc.

5.3 Only one time fixed attenuator to adapt to actual field span losses shall be desirable at the time of installation. No subsequent field adjustment of any kind to adjust shall be required. Use of built-in electronic attenuator (VOA) with software adjustment is mandatory.

5.4 Tenderer shall clearly indicate power budget of each type of optical transmitter / receiver interface.

6 OFC PARAMETERS:

The OFC is directly buried without HDPE duct in majority of routes. The fiber parameters for designing wavelength are mentioned Chapter-3.

The DWDM equipment must support working of all channels in C-band on various fiber as per RDSO specifications IRS: TC 55-2000 or earlier versions with G.652/G.652D.

7 PHYSICAL REQUIREMENT

7.1 The supplier shall specify the dimensions and weight (fully equipped) of the system's shelf(s).

7.2 The system shelf shall be designed to fit into an ETSI rack. The Rack should preferably be 19"/21" size, fitted with glass door in front. The racks shall be of equipment manufactures and make or from branded quality manufacturers like APW President or Rittal make as per specifications.

7.3 The supplier shall describe the slot assignment in the system shelf(s).

7.4 The supplier shall specify how many modules can be equipped in one system shelf.

7.5 The supplier shall specify how many channel modules can be equipped in one system shelf.

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7.6 The supplier shall describe any restriction or special rule related to the system shelf configuration (incompatible modules, relationship between the maximum number of modules per shelf and the bit rate of the services transmitted, specific shelves for particular modules like amplifiers, etc).

7.7 The supplier shall specify the number of shelves, which are needed to equip the minimum and maximum system configuration.

7.8 The system shall have front access. All fiber connections shall be only done at the front of the system shelf. The system should have minimum number of external connections, which are absolutely necessary, with the rest being taken care by backplane wiring.

8 TYPE OF EQUIPMENTS AND THEIR CONFIGURATION AT DIFFERENT LOCATIONS

8.1 All equipment should be provided with required Racks, Sub-racks, Power Supply (1+1 Hot standby). Attenuators, Optical Filters, Optical Multiplexer/ Demultiplexer, Optical Add/Drop Cards, Supervision Channel module, Optical Performance Monitoring Capability Controller Card etc. are to be supplied to support 8 wavelengths of 100G in last mile network at Chennai and Kolkata.

8.2 For the ILA and OADM Locations RailTel will provide space in Rack up to 8 RU on slandered 19" Telecom Rack. In case the offered ILA is required more space in that case bidder shall provide the Rack.

9 TYPES OF OADM EQUIPMENT: As per SOR

DWDM system for providing 100G channel on RailTel's existing DWDM system

The System is required to provide following DWDM network:

9.1 Supplied equipment shall meet following conditions for deployment
9.2 Power Supply shall be redundant and field replaceable
9.3 Shelf controller redundancy is mandatory only if it's failure is traffic impacting and must be field replaceable.
9.4 Equipment should be telecom grade and depth of equipment should be preferably 300mm to assure ample space for proper cable management at rear end.
9.5 100G client interface shall be LR4 type with dual rate
9.6 Bidder can propose Regeneration (3R), if required.

(End of Chapter 3B)

CHAPTER-3 C

TELECOM NETWORK MANAGEMENT SYSTEM

3.1 INTRODUCTION

The DWDM transport system shall be manageable by an integrated single software system. The Network Management System shall provide advanced capabilities in the functional areas of configuration management, fault management, performance management, and security management for optical network elements, sub networks, network as well as allocation of telecom resources for the existing DWDM network.

3.1.1 The envisaged network under present scope is to be managed from Secunderabad NOC as main site. The DR site will be decided by RailTel which will be either Chennai or Mumbai or Kolkata with clients at each of these NOCs and at CNOC. For this purpose:

3.1.2 The existing Network Management System's design concept, functional and informational architecture & physical architecture is in compliance with ITU-T recommendation M.3010.

3.1.3 The tenderer must provide North Bound CORBA or other ITU standard interface for integrating the NMS to an OSS platform. For integrating the NMS to an OSS platform, tenderer will share necessary details related to the interface provided for this purpose viz. dual NBI/API/MIB etc. whenever required by RailTel, conforming to FCAPS requirement.

3.2 NETWORK MANAGEMENT

3.2.1 System shall conform to the Management System requirements of Technical specifications of DWDM in chapter 8A.

3.2.2 NMS Hardware: Hardware offered for NMS should be capable to efficiently manage large no. of alarms resulting due to power supply, equipment failures and 4-5 simultaneous fibre cuts. It is suggested that two servers at each location may be used one for front end alarm processing and other for core operational functionalities of NMS. Minimum requirements for NMS hardware are as follows:

i) The server shall be rack mountable.
ii) Processor: Xeon 8 Core Processor (2 Processors).
iii) DDR Memory- min 64 GB DDR3
iv) HDD- 2x 1 TB
v) Hardware RAID O & I
vi) 1GB E NC 326i 2 port smart array P 410i (storage controller)
vii) Fixed & single Power Supply
viii) DVD ROM
ix) Keyboard & Mouse
x) 18.5" LED Monitor

3.2.3 NMS Software: Bidder shall quote the rate of Hardware and Software separately as required. Along with all the requirements mentioned in the tender document NMS

should be capable to manage at least double the no. of proposed nodes of the network.

3.2.4 The specification of client terminals at RailTel NMS centers shall be advised by tenderer. However, the minimum specification of terminal is 4GB RAM, i5 processor, 500GB Hard and 18.5" LED display with each terminal.

3.3 Local Craft Terminal

Tenderer will supply LCT as per SOR with commercial grade laptops (minimum configuration: 15.6-inch FHD screen, Windows 10 Home Operating System, 7th Generation Intel Core i7 Processor, 4GB Graphic Processor, 1TB HDD with 128GB SSD) to be used as LCTs with the system. The tenderer needs to supply licensed software, required if any, for making them usable as LCTs along with the standard interface cable as part of SOR item no. A 4. Any specific interface requirement or any particular technical specification of the laptops if called for by the Tenderer, to be used as LCTs, may stand brought out. The LCT interface cable for 10 such LCTs will also need to be supplied as part of this SOR item by the Tenderer.

It shall be possible to use the local craft terminal both locally and remotely.

The network element management interface shall be standardized Q3, SNMP or any other open interface and must not require any additional hardware, software.

Management level shall include configuration, alarm and performance management of network element and interfaces.

Remote software download (directly through the network) is required for easy upgradability without the need to physically visit the NMS or hand carrying data (CD / DVD etc.) i.e. support for software download should be available, software should be upgraded to the node plug-in units by loading it from any point in the network.

Remote software downloading from NMS/EMS should not affect the live traffic.

3.3.1 The LCT software, if so needed for operation of laptops as LCT, shall be provided with Backup in CD/ pen drive by the Tenderer.

(End of Chapter 3C)

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CHAPTER-3D

A. EMI, ENVIRONMENT AND POWER SUPPLY

4.1 ELECTROMAGNETIC INTERFERRENCE

Any Telecommunication circuits in the vicinity of AC Traction running parallel to 25 KV AC lines are liable to be affected by AC induced voltage. Therefore, precautions should be taken to eliminate the possibility of induced voltage affecting equipment and human. A large number of sections where DWDM is to be deployed are already electrified with 25 KV AC traction.

Special protective measures (viz. provision of G.D tubes, fuses and earthing etc) are required to be taken for telecommunication lines entering 25 KV sub station/switching posts.

Instructions for protection of RailTel/Railway staff/working personnel on signaling and telecommunications installations on 25 KV AC traction shall be strictly adhered to. Precautions are required to be taken on account of following:

i) Proximity of live conductor.
ii) Pressure of return current in Rails.
iii) Induction in all metallic bodies situated close to over head equipment.

The tenderer will also comply to the EMI classification and specification ETS 300 386-1 and 386-2.

4.2 ENVIRONMENTAL CONDITIONS

All equipment, test instruments, special tools and fixtures etc. shall be able to work at the specified parameters under environmental conditions specified for QM – 333 Categories B 2 and should be capable of maintaining the guaranteed performance with operational lifetime of 15 years minimum when operating continuously and particularly under the following environmental conditions:

1.	Temperature	OPERATE : For all supplies 0^0 to + 40^0 C guaranteed and upto +50^0C degraded STORAGE: -10^0 C to +70^0 C
2.	Humidity	At any relative humidity upto 95% within the temperature range of 0^0 C to 40^0 C
3.	Altitude	At any altitude upto 2000 m above sea level
4.	Sand and Dust	With a buildup of dust on operational surface to a level such as may occur because of imperfections in the sealing of equipment, housing and conditions prevailing in subtropical desert conditions.
5.	Tropicalisation	Shall be fully tropicalised with all cards coated with lacquer or suitable protective coating.
6.	Shock and vibration	Shall withstand transportation and handling by air, sea and road under packed conditions.
7.	Salt, fog and Mould	Shall withstand continuous usages in marine growth environment.
8.	Electromagnetic	Shall meet the requirements as per IEC Compatibility 801.

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4.3 POWER SUPPLY ARRANGEMENT

4.3.1 The DWDM equipment shall be capable of working on nominal -48 V DC supplied through maintenance free/ low maintenance batteries with voltage varying from - 40V DC to -60 V DC. The equipment shall operate over this range without any degradation in performance. The equipment shall be capable of withstanding voltage spikes of 3 Volts over the maximum voltage.

4.3.2 The power consumption of the complete equipment shall be worked out at -48V DC and 230V AC. The power plant of 48 V, SMPS based float cum boost chargers of 50 Amps DC or higher capacity in N+1 configuration along with set of 48V, 300 AH or of higher capacity maintenance free batteries shall be provided by RailTel.

4.3.3 The 48V DC supply shall be extended to equipment rack using stranded PVC insulated copper cable as per IRS/TEC specs. Tenderer shall workout on power consumption of the equipment at each location and furnish the details in the bid. The tenderer will supply DC power cable with double current capacity of the required current for dropping all 8 channels from each direction at client level. The length of DC power/earthing cable shall be assessed and supplied by tenderer for each site as per site requirement. Physical work shall be done by RailTel. Alarm Cable of minimum 20 m length should also be supplied with 20% of equipments to extend external/power supply alarms from charger to the equipment for monitoring the alarms from NMS.

4.4 PROTECTION AGAINST TRANSIENTS, SURGES AND LIGHTNING:

4.4.1 All the equipment shall be protected from induced current, voltage as per CCITT Regulations against 25 KV AC catenary carrying 1000 Amp. current. Protection should be provided against all surge/transient voltages.

4.5 EARTHING

4.5.1 The earthing arrangement shall be provided by RailTel for earthing of optical and digital equipment at the equipment room on a bus bar with value less than one ohm (approx.). The extension of the same to the equipment rack / equipment using earth cable 16 sq mm (min.) copper of ISI make, will be the responsibility of the Tenderer.

(End of Chapter 3D)

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CHAPTER-3

E. INSPECTION AND INSTALLATION, TESTING & COMMISSIONING

Following shall also be covered for factory acceptance testing as per tender Specifications and ITU-T recommendation.

5.1 TESTS AND MEASUREMENTS (local as well as remote)

The test loops should be provided for the following

Interface loop: Test loop for the interface – the interface card shall enable looping back the incoming signal directly.

Equipment loop: Test loop for the card-the outgoing signal is looped back directly into the unit.

Optical levels: Measuring of the levels of transmitted and received optical sig-nals should be possible.

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5.2 TEST CATEGORIES

i) The following tests shall be conducted for acceptance of the equipment and the system before final acceptance of the system. Waiver of Part or whole of type tests can be considered if proof of having done the tests by independent body or PTT authority is submitted.

a) Pre-Factory Acceptance Testing
b) Factory Acceptance Testing (FAT)
c) Pre-commissioning test (after installation) for total integrated system.
d) Site Acceptance Testing (SAT)
e) Trial Run

ii) These tests shall be carried out on all equipment supplied by Tenderer including those supplied by sub-vendors, if any.

iii) Tenderer shall arrange all necessary test instruments, manpower, test-gear, accessories etc., for SAT and Trial Run.

iv) All technical personnel assigned by Tenderer shall be fully conversant with the system specifications and requirements. They shall have the specific capability to make the system operative quickly and efficiently and shall not interfere or be interfered by other concurrent testing, construction and commissioning activities in progress. They shall also have the capability to incorporate any minor modifications/suggestions put forward by purchaser /Engineer.

v) DELETED.

vi) Test Plan: The Contractor shall submit to Purchaser 'Test Plans' well in advance of commencement of actual testing in each of the above mentioned test categories.

The plans shall include:

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1) System/Equipment functional and performance description (in short) and Tests to be conducted and purpose of test.

2) Test procedures (including time schedule for the tests) and identification of test inputs details and desired test results

3) **Test Report:**

The observations and test results obtained during various tests conducted shall be compiled and documented to produce Test Reports by Tenderer. The Test Reports shall be given for each equipment/item and system as a whole. The report shall contain the following information to a minimum:

i) Test results

ii) Comparison of test results and anticipated (as per specifications) test result as given in test plans and reasons for deviations, if any.

iii) The data furnished shall prove convincingly that

a. The system meets the Guaranteed Performance objectives
b. Mechanical and Electrical limits were not exceeded.
c. Failure profile of the equipment during the tests are well within the specified limits

vii) Failure of Cards/Components:

Till the system is accepted by the Purchaser, a log of each and every failure of components shall be maintained. It shall give the date and time of failure, description of failed component, circuit, module, component designation, effect of failure of component on the system/equipment, cause of failure, date and time of repair, mean time to repair etc. Repair/modification done at any point of time at one site, shall be carried out by Tenderer at all the sites. Detailed documentation for the same shall be submitted to Purchaser for future reference.

If the malfunction and/or failures of a unit/module/sub-system/equipment repeat during the test, the test shall be terminated and Tenderer shall replace the necessary component or module to correct the deficiency. Thereafter, the tests shall commence all over again from the start.

If after the replacement the equipment still fails to meet the specification, Tenderer shall replace the equipment with a new one and tests shall begin all over again. If a unit/ subsystem/module has failed during the test, the test shall be suspended and restarted all over again only after the Tenderer has placed the Equipment back into acceptable operation. Purchaser's approval shall be obtained for any allowable logical time required to replace the failed component/unit/module/sub-system.

viii) **Readjustments**

No adjustments shall be made to any equipment during the acceptance tests. If satisfactory test results cannot be obtained unless readjustments are made, Tenderer shall carry out only those readjustment needed to ready the equipment/system for continuance of tests. A log of all such adjustments shall be kept giving date and time, equipment, module, circuit, adjustments, reasons, test result before and after

adjustment etc. Fresh acceptance tests shall be conducted after the readjustments have been completed.

5.3 **Pre Factory Acceptance Testing**

The Tenderer on his own exactly in line with FAT shall conduct pre-factory acceptance testing and test reports for the same shall be forwarded to Purchaser/Engineer before start of FAT.

5.4 **Factory Acceptance Testing (FAT)**

Factory acceptance tests shall be carried out after review and approval of FAT procedure/documents as per bid requirements and review of Pre-Factory acceptance results & shall be conducted at the manufacturing facilities from where the respective equipment/subsystems are offered. The factory acceptance testing shall be conducted in the presence of the Purchaser/Engineer. The tests shall be carried out on random sampling of 8% lot size with minimum quantity of 4 nos. on main equipment /items and factory acceptance certificates shall be issued. The factory tests shall include but not be limited to:

A) **Equipment Testing:**

i) Mechanical checks to the equipment for dimensions, inner and outer supports, finishing, welds, hinges, terminal boards, connectors, cables, painting etc.

ii) Electrical checks including internal wiring, external connections to other equipment etc.

iii) Check for assuring compliance with standards mentioned in the specifications.

iv) Individual check on each/module/sub-assembly in accordance with the modes and diagnostics programs of the Tenderer.

v) Checks on power consumption and heat dissipation characteristics of various equipment

vi) Environment testing and other laid down tests in Type Tests plan of the specification of the equipment.

vii) Functional testing

viii) Any other test not included in FAT document but relevant to the project as desired by the Purchaser/Engineer at the time of factory acceptance testing.

B) **System Integration Testing**

Functional and performance test should be conducted for the complete system concerning and connecting the DWDM equipment and all major equipment constituting the system (including the equipment supplied by sub-vendors, as applicable) simulating the complete network with appropriate optical attenuators connecting between DWDM nodes to simulate the optical loss of Optical Fibre Cable. The system shall include the total Network Management System. All the functions of NMS shall be demonstrated in totality (as per requirements/specifications of this

document including management of DWDM). All equipment shall be connected using the same cables (interfaces/components) as will be used during final installation so that the system can be tested in its final configuration. This testing shall be conducted at the manufacturing facility of the main (DWDM) equipment.

5.5 Installation

After successful completion of factory acceptance testing, equipment shall be sent to site for installation. Equipment without factory acceptance certificates shall not be acceptable at site.

Prior to installation, all equipment shall be checked for completeness as per the specifications of equipment required for a particular station. Installation shall be carried out in accordance with the installation manuals and approved installation drawings in the best workmanship.

Tenderer shall indicate the number of teams and the list of equipment for each teams to be required for installation of the total telecom system in order to complete the work within the stipulated time frame.

Tenderer shall bring all installation tools, accessories, special tools, test gears, spare parts etc. at his own cost as required for the successful completion of the job.

If during installation and commissioning under the supervision of the tenderer any repairs are undertaken, the maintenance spares supplied with equipment shall not be used for the repair. Tenderer shall arrange his own spare parts for such activities till such time the system has been finally accepted by the Purchaser. A detailed report & log of all such repairs shall be made available by the Tenderer to Purchaser/Engineer and shall include cause of faults and repair details, within 2 weeks of fault occurrence.

A detailed time schedule for these activities shall be submitted by Tenderer to Purchaser/Engineer to enable their representatives to be associated with the job.

Tenderer shall supply all installation materials required for proper installation of the equipment. These shall include but not be limited to, all connectors, interbay and inter equipment cables, power supply cables and connectors, power distribution boxes, anchoring bolts, nuts, screws, washers, main distribution frames, audio distribution frames, voice frequency cables, junction boxes etc.

The installation of equipment shall be supervised by the tenderer in such a manner so as to ensure neat and clean appearance in accordance with approved installation document drawings. All inter bay, power supply and other cables shall be routed through wall mounted cable trays. No cable shall be visible. All through wall openings, trenches etc. shall be properly sealed to prevent the entry of rodents, insects and foreign materials.

Telecom room of one of the attended & unattended sites shall be made as model rooms and Tenderer shall take approval from Purchaser/engineer on various aspects spacing etc. After taking approval Tenderer shall take up installation at other sites in similar fashion in association with RailTel installation team.

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5.6 Pre-Commissioning

On completion of installation of equipment, the correctness and completeness of the installation as per Manufacturer's manual and approved installation documents shall be checked by the Tenderer on his own.
A list of Pre-Commissioning tests (same as approved by the Purchaser/Engineer for site acceptance testing) and activities shall be prepared by Tenderer and the test shall be carried out by the Tenderer on his own. After the tests have been conducted to the Tenderer's own satisfaction, the Tenderer shall provide the test results for review by Purchaser/Engineer and then offer the system for Site Acceptance Testing.

During pre-commissioning, if any fault occurs to any equipment or system, Tenderer shall identify the same and provide report/history of all faults to the Purchaser.

During installation and pre-commissioning of the telecom system, Tenderer shall have enough number of commissioning spares so that the installation is not held up because of non-availability of commissioning spares. Tenderer shall ensure that the spares meant for operation and maintenance are not used during installation and commissioning.

5.7 Site Acceptance Testing (SAT)

On completion of Pre-commissioning, site acceptance testing shall be conducted on the system as per approved SAT procedures and its constituents by the Tenderer under the presence of Purchaser/Engineer.

The tests shall include, but not be limited the following:

a) Checks for proper installation as per the approved installation drawings for each equipment/item and system as a whole.

b) Guaranteed performance specifications of individual equipment/item.

c) Self diagnostics test on individual equipment

d) Tests on metering and alarm panels

e) Tests on remote alarm transmission and reception

f) System tests on per hop basis

g) END TO END BER 24 Hrs and RFC 2544 for 48 Hrs,

h) APS < 50 ms (All combinations of Backbone and Metro Access to be tested)

5.7.1 PROVISIONAL ACCEPTANCE CERTIFICATE (PAC)

On Installation of the equipment in the complete section/ring and after conclusion of Site Acceptance Testing, Provisional Acceptance Certificate (PAC) will be issued by General Manager/NTP/CO or their authorized representatives of concerned region so that trial run/ field trials can be started. PAC will not be held back for want of minor deficiencies not affecting the functioning of the equipment. Deficiencies, if any, pointed at the time of issuance of PAC, will be rectified by the contractor within one month.

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5.8 SPARES

5.8.1 MAINTENANCE SPARES

Unit rates for each spares required for operation and maintenance shall be provided. Tenderer shall also provide the address, contact person, fax, telephone no. of the manufacturer of the spare parts, if different from the tenderer itself. The Tenderer shall warrant that spare part for the system would be available for minimum of 10 years after system commissioning (taking over). After this period if the Tenderer discontinues the production of the spare parts, then he shall give at least 12 months notice prior to such discontinuation so that Purchaser may order the requirements of spares in one lot.

8% mandatory spares (for operation and maintenance) shall be provided for all electronic cards including mother boards, back plane for each system, subsystem, equipment, etc. (with round off at the higher side with two cards minimum), as against SOR item no. A2. Spares shall be provided from the same manufacturing facilities/location from where the respective equipment, subsystems are offered.

The list of the required spares being supplied with unit cost and total cost should be attached along with the bid.

5.8.2 Commissioning spares

The commissioning spare shall be arranged by the Tenderer to cater to the requirement during installation, commissioning, site acceptance testing, trial run and warrantee period. These spares shall be readily available with the Tenderer, at specified locations.

These commissioning spares are different from maintenance spares and Tenderer shall not use maintenance spares as commissioning spares till expiry of warranty period.

5.9 TRIAL RUN/FIELD TRIALS

Upon conclusion of the site acceptance testing the Tenderer shall keep the facilities commissioned for 2 months for 'TRIAL RUN/FIELD TRIALS'. During this period Tenderer shall provide all specialist Engineers & Technicians including experts at both the NMS's to maintain the total log, incidents, failures & for assisting site engineer & for total co-ordination. However, the normal operation and maintenance of the system shall be performed by the personnel of the Purchaser trained for the purpose.

If during 'Trial run' any defect is noted in the system, the Tenderer shall rectify, replace the same to the satisfaction of Purchaser's/Engineer. The decision to repeat the final test or restart the 'Trial' shall be of Purchaser/Engineer depending upon the severity of the defect.

During trial run, if any fault occurs to any equipment of system, Tenderer shall identity and rectify the same and provide report, history of all faults to the Purchaser.

Ideally, during the 'Trial run, no shutdown of the system due to failure of equipment, power supply etc. should happen. A record of all failures shall be kept for each manned/unmanned station and the availability of the system on per hop and end to End basis shall be calculated, accordingly and results submitted to Purchaser/engineer.

If the system fails to come up to the guaranteed performance, the Tenderer, within a period of thirty (30) days shall take any and all corrective measures and resubmit the system for another 'Trial Run' of trial period. All modifications, changes, corrective measures, labour etc. shall be at the cost of the Tenderer. In case the date of completion for the second trial run exceeds the time schedule for the project, he shall be liable to pay liquidated damages. If the system fails to reach the guaranteed performance even after the second trial run, the Purchaser shall be free to take any action as he deems fit against the Tenderer and to bring the system to the guaranteed performance with the help of third party at the expense of the Tenderer.

5.10 FINAL ACCEPTANCE

The final acceptance of the works completed shall take effect from the date of successful completion of 12 months of Maintenance Supervision as per clause 2.5 of Chapter 4, after issue of PAC (i.e. the date of Final Acceptance shall be reckoned from the date of issue of the Final Acceptance Certificate of the last installed equipment) provided in any case that the contractor has complied fully with his obligations in respect of each item under the contract. The Final Acceptance Certificate of respective region shall be signed by authorized representative of RailTel nominated by the Executive Director of the concerned Region and forwarded to CO for issue by GM/NTP/CO. Notwithstanding the issue of Final Acceptance Certificate the contractor and the purchaser shall remain liable for fulfillment of any obligation incurred under the provision of the contract prior to the issue of Final Acceptance Certificate which remains unperformed at the time such certificate is issued and for determining the nature and extent of such obligation the contract shall be deemed to remain in force between the parties hereto.

5.11 QUALITY ASSURANCE

i) Tenderer shall submit the details of Quality Assurance program followed by him beginning with raw materials, active, passive and fabricated components, units, sub-assemblies, assemblies, wiring, interconnections, structures. etc. to finished product. Tenderer shall obtain and forward the Quality Assurance Program for equipment supplied by Sub-vendor, if any.

ii) The Purchaser's/engineer reserves the right to inspect and test each equipment at all stages of production and commissioning of the system. The inspection and testing shall include but not be limited to raw materials, components, sub-assemblies, prototypes, production units, guaranteed performance specifications etc.

iii) For Factory inspection and testing, Tenderer shall arrange all that is required e.g. quality assurance personnel, space, test gear etc. for successful carrying out of the job by the Purchaser/Engineer, at Tenderer's cost, at the Manufacturer's works.

iv) Purchaser's/Engineer shall have free entry and access to any and all parts of the Manufacturer's facilities associated with manufacturing and testing of the system at any given time.

v) It shall be explicitly understood that under no circumstances shall any approval of the Purchaser's/Engineer relieve the Tenderer of his responsibility for material, design, quality assurance and the guaranteed performance of the system and its constituents.

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vi) Tenderer shall invite the Purchaser's/Engineer, at least 7 days in advance, of the date at which system shall be ready for Inspection and Testing. All relevant documents and manuals approved Engineering drawings etc. shall be available with the Purchaser/Engineer well in advance of the start of Inspection and Testing.

vii) Purchaser's Engineer or his representative shall, after completion of inspection and testing to their satisfaction, issue factory acceptance certificates to release the equipment for shipment. No equipment shall be shipped under any circumstances unless a factory acceptance certificate has been issued for it, unless agreed otherwise by Purchaser's Engineer.

5.12 TYPE TEST

5.12.1 Type test are defined as those test which are required to be carried out to prove the design, process of manufacture and compliance of the equipment being supplied in the tender to the tender specifications DWDM equipment with regard to the following:

- Environmental and Immunity/ Emission tests to be carried out as per and environmental conditions as specified in technical specification in Chapter 8A.
- Not Used.

5.12.2 The Tenderer shall submit, within two weeks of Award of Contract, copies of test reports and certificates for all of the Type Test for all equipment specified in the tender document.

5.12.3 The Type Test must have been performed in the last five years on the equipment which is required to be type tested. The tenderer shall have carried out type test and obtained type approval certificate during the last five years on one proto type sample of each of the equipment of the same type and model as that being offered against this tender to prove compliance of the equipment offered to specification mentioned in the tender document or equivalent ITU-T specifications. Type approval certificate given by Telecom Engineering Centre (TEC) of the Department of Telecommunication, Govt. of India, or TSEC certificate given by BSNL (QA) or type approval certificate given by an Internationally reputed laboratory/agency (accredited to carry out tests as per ITU-T specifications) shall be accepted if the same has been carried out/witnessed by the laboratory/agency itself or the type tests carried out by the OEM has been certified by the said laboratory/agency. Necessary Credentials of the laboratory/agency to be submitted by the tenderer. These certificates may be accepted by RailTel only if they apply to materials and equipment that are same as those due to be delivered under the Contract and only if test procedures and parameter values are identical to those specified in this specification.

5.12.4 Alternatively, Type Test shall be performed by the tenderer at no additional cost to RailTel for equipment types as identified above for which certification is not provided as required above, or if it is determined by RailTel that the certification provided is not acceptable.

5.12.4.1 Type Test shall be certified or performed by Internationally reputed laboratories (necessary credential to be submitted by the bidder as documentary evidence) or Government laboratories in India using material and equipment data sheets and test procedures that have been approved by RailTel.

5.12.4.2 The Tenderer shall provide a detailed schedule for performing all specified type tests. These tests shall be performed in the presence of a representative of RailTel.

5.12.4.3 The Tenderer shall ensure that all type tests can be completed within the time schedule mentioned in the tender schedule.

5.12.4.4 In case of failure during any type test, the supplier is either required to manufacture a fresh sample lot and repeat all type tests successfully or repeat that particular type tests at least three times successfully on the samples selected from the already manufactured lot at their own expenses. In case fresh lot is manufactured for testing then the lot already manufactured shall be rejected.

5.12.4.5 The contractor shall supply equipment/material for sample selection only after the Quality Assurance Plan has been approved by RailTel. The sample material shall be manufactured strictly in accordance with the approved Quality Assurance Plan. The Contractor shall submit for RailTel approval, the type test sample selection procedure. The selection process for conducting the type test shall ensure that samples are selected at random. At least three samples of the proposed equipment shall be offered for selection, of which one sample shall be selected.

(End of Chapter 3E)

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CHAPTER-3

F. TRAINING, VENDOR DATA REQUIREMENT, DOCUMENTATION, AND DESIGN GUIDELINES

6.1 TRAINING

Tenderer shall train personnel of Purchaser/engineer in all aspects of DWDM communication system.

The training course shall be conducted at the manufacturing facilities from where the respective equipment/subsystems are manufactured/ offered or in India if the firm can arrange full-fledged training facilities in case their manufacturing facilities are located outside India.

It shall be explicitly understood, that Purchaser's/Engineer's personnel shall be fully associated during Engineering, Installation, Testing and Commissioning activities and this opportunity shall be taken by Tenderer to impart on the job training in addition to the above training course.

Tenderer offer excludes costs of transportation, lodging and boarding of the trainees which shall be arranged by the Purchaser.

The training course to be conducted at the manufacturing facilities shall be designed to train the trainees in all aspects of System engineering, equipment operation, installation and functional details, theory of operation of equipment, trouble shooting and familiarization with the equipment at card and component level. All equipment used for training shall be identical to those quoted and supplied for site installation in hardware and software versions.

Tenderer shall provide comprehensive documentation, course material, manuals, literature etc. as required for proper training of personnel at his own cost. Consolidated and comprehensive documentation shall be available to each participant. After the completion of course, all such materials shall become the property of the PURCHASER. Tenderer shall update the course material of manuals in case there are any changes owing to revision/modifications in equipment/system specifications.

Tenderer shall, prior to start of training, send complete training program including details of each course, duration, subject matter etc. The Purchaser/Engineer reserves their right to suggest any additions/deletions in the program, which shall be incorporated by the Tenderer at no additional cost.

6.2 VENDOR DATA REQUIREMENT AND DOCUMENTATION

One set of Documentation shall be supplied with each system. In addition, 12 more sets of full documents shall be supplied. All documents and manuals shall be in English language only.

The following documents for the complete system shall be supplied and approved by Purchaser/Engineer in order to start Factory Acceptance Testing:

A) System description, System configuration diagram & Connectivity diagram

B) Detail technical manual of each type of equipment

Equipment interconnection diagram including details of various interfaces, signaling protocols used at each stage.

Layout of equipment and space requirements for each station.

Installation manual including installation procedure and commissioning.

Supervisory configuration, alarm list, operator interface etc.

C) Maintenance manual of each type of equipment containing:

i. Preventive maintenance procedures.

ii. Trouble shooting/repairs procedures including failure analysis shall provide exhaustive information about repairs including but not limited to removal, reinsertion of components and cards, repairs, adjustments, tuning, calibration, tools required for a particular operation, test points, including turn around time for repair and the details of the maintenance support service centre to be furnished in the bid and all other maintenance related details.

iii. Expansion possibilities of the system without causing deterioration in the system performance.

iv. Any other data, document not specifically mentioned, but required for the satisfactory testing, installation and commissioning, operation and maintenance of the system shall be provided.

v. Documents to be supplied after trial runs but before System commissioning (Acceptance of the System by Purchaser/Engineer).

6.3 DESIGN GUIDELINES

i) Equipment shall conform to the similar housing standards and shall preferably be integrated in one 19" /21" rack.

ii) The optical equipment should be able to work under environmental conditions mentioned in clause 4.2 of Chapter 3D.

iii) All venting, cooling shall be natural. However, in case of equipment with internal forced cooling, suitable dust filters may be used, if required.

iv) All equipment shall have sufficient number of alarms and supervisory indications and shall be provided with self-diagnostic facilities. All alarms and monitoring & diagnostic facilities shall be built-in & shall be displayed on the front panel of the equipment for ease of maintenance. It shall be possible to transmit these indications, parameters to the control station /NMS on real time basis.

v) The healthy condition of the units shall be displayed by green LEDs, unhealthy condition by red LEDs.

vi) For important switches, the maintenance personnel shall provide controls on the front panel with suitable safeguard to avoid accidental operation. Manual changeover should be performed by more than one sequential operating procedure to avoid accidental operation.

vii) All equipment shall be immune to EMI; RFI interference generated by any nearby source & shall meet the latest international standards in this regard.

viii) The equipment shall be capable of functioning with minimum maintenance and shall be preferred to have no requirement of any preventive maintenance.

ix) All PCBs used shall be glass epoxy type and shall not chip owing to repeated soldering/ desoldering . The PCBs shall not warp on any account.

x) All wiring-including field interconnection wiring shall be cabled and clamped to the chassis. The wiring shall follow standard color-code. All patch cords shall be provided with connectors matching to the cable used and shall have identification markings.

xi) All sub-assemblies or modules, switches and controls and the circuit components shall be so mounted as to permit their replacement without appreciable disturbance to other components.

xii) If the vendor is not using distributed power supply system on individual module basis then the Power supply cards shall be duplicated (1+1). However one standalone power supply card shall be able to run the system for its entire lifetime.

xiii) All equipment sub racks, housings shall be provided with antistatic wristbands, if required for safe handling of Cards.

xiv) If required and necessary the Tenderer can test the fiber characteristic. Tenderer is fully responsible for the performance of the network.

xv) The equipment should have modular design and should be configurable in number of operational modes to perform complex and different network functions without need of any additional software.

xvi) The nodes (stations) should be hitless i.e. removing or inserting plug-in-units must not affect the existing traffic on other units.

xvii) It is required that the laser transmitter is automatically shut down when the incoming signal is missing.

xviii) The supplier shall provide link engineering for the configuration once the sites/ locations are offered to the successful bidder. The splicing loss per splice is as per specifications of the cable referred above and splicing is in general at every 3 km. Suitable connector losses to be taken and specified. Link engineering shall keep necessary system margin for satisfactory working over lifetime and the Tenderer should give complete link budgeting with the specifications of the optical fibers annexed in the document.

(End of Chapter 3F)

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CHAPTER 4

A. COMMERCIAL TERMS & CONDITIONS

1. Offer letter and Validity of offer

1.1 The bidder shall complete the offer letter (Chapter 1) and the Price Schedule (Chapter 2) furnished in the tender documents, indicating the goods to be supplied, description of the goods, associated technical literature, quantity and prices etc.

1.2 The offer should remain valid for a minimum period from the date of opening of tender including the date of opening as indicated in Bid Data Sheet (BDS) Chapter 5.

2. Warranty

2.1 The warranty would be valid for a period as indicated in Bid Data Sheet (BDS) Chapter 5. The supplier shall warrant that stores to be supplied shall be new and free from all defects and faults in material, workmanship and manufacture 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 equipment 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.

2.2 If it becomes necessary for the contractor to replace or renew any defective portion/portions of the supplies under this clause, the provisions of the clause shall apply to the portion/portions of the equipment so replaced or renewed or until the end of the above mentioned period or twelve months, whichever may be later. If any defect is not remedied within a reasonable time of 30 days, the Purchaser may proceed to do the work at the contractor's cost, but without prejudice to any other rights which the Purchaser may have against the contractor in respect of such defects.

2.3 Replacement under warranty clause shall be made by the contractor free of all charges at site including freight, insurance and other incidental charges.

2.4 Warranty Support

2.4.1 Material for repair during Warranty Period shall be handed over /taken over to contractors engineer at regional NOC's or mutually agreed RailTel PoP location.

To enforce fulfillment of support objectives, bidder shall make available services of one qualified engineer each at NOC site and DR Site to the satisfaction of RailTel for level II support during the warranty period. The cost for Technical Engineering support etc., may be quoted as provided for in SOR. The Contractor's Engineer shall be responsible to identify the fault and advise corrective measures and ensure that defective cards are replenished. The cost of cards repairs etc. shall be included in the quoted bid price towards warranty.

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During the warranty period, the contractor shall remain responsible to arrange replacement within 30 days and for setting right at his own cost any equipment installed by him which is of defective manufacture or design or becomes unworkable due to any cause whatsoever. The decision of the RailTel's representative in this regard to direct the contractor to attend to any damage or defect in work shall be final and binding on the Contractor. In case contractor fails to replace any faulty part within 30 days period, penalties will be imposed as per clause 5.2 of Annexure-II.

2.4.2 During the warranty period, the contractor shall be responsible to the extent expressed in this clause for any defects that may develop under the conditions provided for by the contract and under proper use, arising from faulty materials, design or workmanship in the plant, or from faulty execution of the plant by the contractor but not otherwise and shall remedy such defects at his own cost when called upon to do so by the Purchaser Engineer who shall state in writing in what respect the portion is faulty.

2.4.3 During the free warranty maintenance period, contractor should stabilize the working of the system. Purchaser has the right to extend the period of supervision of the maintenance free of cost till the system stabilizes and works satisfactorily for a reasonable period of time. If during the time any equipment etc. is to be added or deficiencies are to be rectified to make the system work trouble free ,the same also will have to be done by the contractor at no cost to RailTel as to make good all the deficiencies.

2.5. Maintenance Supervision

2.5.1 After the proposed network is commissioned and placed in service and after provisional acceptance certificate is issued, the contractor shall be responsible for proper maintenance supervision of the network free of cost for a period of twelve months from the date of provisional acceptance.

For this purpose he shall prepare a maintenance plan and make available the services of qualified maintenance engineer stationed at the location approved by Purchaser's Engineer who will guide and supervise the RailTel maintenance staff. The tenderer shall keep minimum two maintenance engineers at the locations approved by RailTel, who will visit the total installation at least once in three months or earlier if the situation so warrants with the provision that monthly reports of the failures and health of the equipment is generated from the NMS and is made available jointly signed by contractor and RailTel Official.

In addition One NMS trained engineer shall be provided at the NOC location, including DR site, as part of maintenance supervision obligation. The NOC engineer will ensure that the down time shall not be more than 4 hours for equipment failure. Additional manpower if considered necessary shall be provided by contractor to stabilize the network. A penalty of Rs. 1000/- per hour of down time of network shall be imposed on the contractor for not meeting the down time prescribed. The Contractor's Engineer shall be responsible to identify the fault and advise corrective measures and ensure that defective cards are replenished.

2.5.2 During this period of maintenance supervision if any lacuna is noticed in the functioning, as a result of any deficiency in work, the contractor will rectify the same at no cost to RailTel. During such rectification if any faulty equipment/modules need

replacement or repair, they shall be provided by the contractor from the set of equipment or modules that the contractor should bring to the site of installation in addition to all the materials to be supplied against this contract. Use of spare modules covered under the Schedule of material of this tender shall not be permitted to be used during installation, commissioning and period of maintenance supervision.

2.5.3 To summarize, the total period of warranty as per BDS in Chapter-5, will comprise of first 12 months of Maintenance Supervision (after issue of PAC) extendable by RailTel for reasons as explained, as per para 2.5 above, post which FAC will stand issued. Issue of FAC will be followed by 24 months of warranty as per para 2 & 2.4 above.

3. Long Term Maintenance Support

3.1 Tenderer (OEM) shall provide maintenance support after successful completion of the warranty obligations for a minimum period of 5 years (SOR item no. B5. The long term maintenance support shall be comprehensive and include all hardware and software of equipment, NMS etc. supplied against this contract. RailTel should be extended the benefits of software update/up-grades made by OEM on the system from time to time to improve performance. During this period the scope of work as mentioned in clause 2 above & its sub clauses except clause 2.5 above, will be applicable. This includes the provision of a qualified Engineer for level-II support in NOC site including DR site (2 in total).

3.2 Tenderer/OEM (through its Indian subsidiary), shall be paid @ 3.5% of supply cost per annum towards Long Term Maintenance Support after completion of warranty period, to undertake repairs/replacements of all type of module/ card/assembly/ subassembly and update/upgrade of software released during this period and /or which may fail in the network after the warranty. Only incremental cost in % over and above this, if perceived by the OEM and Tenderer, may be indicated in Schedule of Requirement and shall be added towards evaluation of tender. If however the tenderer feels that his AMC Cost is less than 3.5% per annum, he should give suitable discount in equipment pricing. For AMC he will be paid @ 3.5% per annum only. If the Tenderer quotes a higher base rate for AMC, he will be paid at his quoted rate per annum and five year differential cost shall be added to offered cost for evaluation. AMC would have to be valid for minimum period of **5 years after** the warranty.

In case a tenderer quotes AMC rates lower than 3.5%, no advantage will be given to him/her for evaluation purposes. In case the tenderer wins the contract his cost against supply items will be reduced by differential (w.r.t. 3.5%) of AMC rates & he will be paid accordingly against the cost of supply. AMC charges to him, however, be paid only @ 3.5% per annum.

3.3 Separate agreement for AMC after warranty period shall be entered with OEM by RailTel. A fresh Bank Guarantee for a value of 10% of the value of the AMC contract's annual value valid for a period of 64 months (4 months beyond the AMC period of 5 years) from the date of issue of LOA shall be required to be submitted by OEM/ Tenderer for due fulfillment of long term maintenance support obligation.

3.4 As part of level-II support, one experienced engineer should be available at the NOC site during general shift (to be available beyond shift hours, when needed, for meeting SLAs) and should work for RailTel's exclusive requirement.

3.5 Quarterly payment for AMC Charges would be made by RailTel after successful completion of AMC Services of that quarter and on the certificate furnished by concerned RailTel representative of the Executive Director of the Region having the NOC and DR sites.

Note: The acceptance of the above clause is mandatory and specific acceptance from OEM is required to be enclosed as per Form no.3. Any deviation / non acceptance will lead to rejection of the bid summarily.

3.6 Detailed standard conditions applicable for the Annual Maintenance Contract between RailTel and the Contractor are given in Annexure-II, chapter-7.

4. Delivery Period

The materials as per SOR are required to be delivered within period as indicated in Bid Data Sheet (BDS, Chapter 5) to the site / at each of the Regional centers to be decided by CO/respective Regional EDs/RGM, transported to different locations which will be provided by respective Regions to the successful bidder.

Tenderer will be given extra time for installation & commissioning to be decided in mutual consultation with respective Executive Directors/RailTel. The installation and commissioning shall, however, be completed within period as indicated in Bid Data Sheet (BDS, Chapter 5). For items that cannot be installed for want of site readiness or as per the decision of the Executive Director of the region, the same have to be returned to RailTel stores by the Tenderer. Road permit will be facilitated by RailTel and shall issue necessary request letter etc. Tenderer are required to obtain the road permit. However, it has no bearing on delivery period.

4.1 RailTel Office Details:

SN	Region	Head Office	Address
1	Corporate Office	New Delhi	General Manager/NTP Plate-A, 6th Floor, Rail Nilayam, Office Tower-2, NBCC Building, East Kidwai Nagar, New Delhi-110023 Email: pawaria@railtelindia.com

5. Payment Terms

5.1 75% payment of the value of the supply items would be made on receipt of material by the consignee (at site /the stores, to be decided by CO/respective regional ED/RGMs) duly inspected and on submission of the following documents subject to any deductions or recovery which RailTel may be entitled to make under the contract:

(i) Valid Tax Invoice
(ii) Delivery Challan
(iii) Packing list.
(iv) Factory Test Report.
(v) Purchaser's Inspection certificate

(vi) Consignee receipt
(vii) Warranty certificate of OEM
(viii) Insurance certificate
(ix) A certificate duly signed by the firm certifying that equipment/ materials being supplied are new and conform to technical specification.

5.2 Deleted.

5.3 15% payment of the value of Supply items of the PO/LOA shall be made by RailTel on Installation & Commissioning at site, 5% payment of value of Supply items of the PO/LOA on issue of Provisional Acceptance Certificate (PAC) and the last 5% payment of the value of Supply items of the PO/LOA shall be made by RailTel on issue of Final Acceptance Certificate (FAC) which will be issued by respective ED/RGM of the concerned Region.

(15% + 5%) payment of value % of supply items of the PO/LOA which could not be installed for want of site readiness or as per the decision of Executive Director of the region, will be made on issue of PAC and remaining 5% on issue of FAC.

5.4 Accounting unit/bill passing unit for the supplies under SOR is Corporate Office. Bills to be submitted to the GM/NTP of Corporate Office for passing for payment. The bidder will submit certifying receipt of material & services issued from consignee/regions, for passing for payment.

5.5 Deleted.

5.6 The breakup of taxes has to be furnished and same should be reflected in the bills so that any input credit can be availed by RailTel.

5.7 Payment of Services Items

5.7.1 90% payment of SOR items towards "Design & Installation, Testing, Commissioning and Integration of DWDM System, ILAs and NMS" shall be made **by GM/NTP/CO** on successful Installation, testing & commissioning, 5% on issue of PAC and final 5% on issue of Final Acceptance Certificate.

5.7.2 Payment of SOR item towards "Training of personnel over and above the on-site training during the installation, maintenance and supervision period as detailed in the tender document" shall be made **by GM/NTP/CO** on successful completion of specified trainings.

5.7.3 Payment of SOR item towards "Technical manpower support during warranty period" would be made quarterly **by GM/NTP/CO** after satisfactory performance of engineers and on certificate furnished by concerned RailTel's representative of the Region.

5.7.4 Payment of SOR item towards "AMC/Long term maintenance Support" would be paid quarterly by the concerned Region after satisfactory completion of AMC Services of that quarter and on certificate furnished by concerned RailTel's representative of the Region.

Tenderer Sign with Seal

5.8 In case of supply orders which are not associated with any Design & Installation and Commissioning work, the payment terms against such supply order will be as follows:

5.8.1 75% of the payment at the time of delivery. All the documents required will be as per clause 5.1 above.

5.8.2 Additional 15% of the payment at the time of delivery, if installation is not included in PO/LOA. In case if installation is included, the terms will remain same as in clause 5.3.

5.8.3 Additional 5% of the payment at the time of delivery, if installation is not included in PO/LOA. In case if installation is included, the terms will remain same as in clause 5.3.

5.8.4 5% of the payment after expiry of one year from the date of delivery, if installation is not included in PO/LOA. In case if installation is included, the terms will remain same as in clause 5.3.

6. Performance Bank Guarantee (Security Deposit)

6.1 The tenderer bidder has to furnish security deposit in the form of Performance Bank guarantee @ 10% of issued PO/ LOA value, the same should be submitted within 30 days of issue of LOA/PO, 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. This PBG should be from a Scheduled Bank and should cover warranty period plus four months for lodging the claim. The performance Bank Guarantee will be discharged by the Purchaser after completion of the supplier's performance obligations including any warranty obligations under the contract.

6.2 The earnest money shall be released on submission of PBG. The Performa for PBG is given in Chapter 6 Form No. 1. If the delivery period gets extended, the PBG should also be extended appropriately.

6.3 The Performance Bank Guarantee (security deposit) will bear no interest.

6.4 This PBG would be released after satisfactory completion of contract including warranty period and only after submission of 10 % PBG towards AMC as per clause 3.3 of Chapter 4.

6.5 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 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. Performance Bank Guarantee (security deposit) will bear no interest.

7. Taxes & Duties

7.1 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.

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7.2 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.

7.3 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.

7.4 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.

7.5 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.

7.6 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 alongwith respective HSN/SAC Code under GST Law (Including tax under reverse charges payable by the recipient.

7.7 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.

7.8 In regards to works contract, the tenderer should have registration no. for GST in respective state where work is to be executed and shall furnish GST registration certificate on award of LOA.

7.9 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.

7.10 In case of imported equipment:

Anti Dumping duty, if applicable, on the equipment proposed to be supplied by OEM/Tenderer as per extant instructions of Ministry of Commerce/ Finance Government of India, has to be borne by the tenderer and shall be deducted from the amount payable to the bidder at the time of making payment to the firm, if this duty amount is paid to Custom Authority by RailTel .

7.11 Bidder has to submit an Indemnity Bond as per Form 7 of chapter 6.

8. Insurance

8.1 The Contractor shall take out and keep in force a policy or policies of insurance from the date, the delivery of material starts (including the transit portion) against all liabilities of the Contractor or the Purchaser. The contractor shall take out and keep in force a Policy or policies of Insurance for all materials covered in schedule of requirement irrespective of whether used up in the portion of work already done or kept for the use in the balance portion of the work until such material are provisionally handed over to RailTel. The goods will be issued by purchaser to supplier and risk of goods shall remain with supplier until the issue of PAC by RailTel. Insurance policy has to be kept valid by the contractor till issue of PAC by RailTel.

8.2 The Contractor should ensure the stores brought to site, against risks in consequence of war and invasion, as required under the Emergency Risk (Goods) Insurance Act in force from time to time.

8.3 It may be noted that the beneficiary of the insurance policy should be RailTel or the policies should be pledged in favour of RailTel. The contractor shall keep the policy/policies current till the equipment are handed over to the purchaser. It may also be noted that in the event of contractor's failure to keep the policy current and alive, renewal of policy will be done by purchaser for which the cost of the premium plus 20% of premium shall be recovered from the contractor.

9. Liquidated Damages

The timely delivery is the essence of this tender. Liquidated damages will be applicable at the rate of half percent per week or part thereof for undelivered portion of SOR subject to a maximum of 10% of the cost of Purchase order/LOA for any reason whatsoever attributed to failure of tenderer. RailTel will have the right to cancel the order, place order on alternative source besides levying the liquidated damages as above.

10. Transportation

The rates quoted should be CIP destination. The destination shall be defined POP / nominated office of RailTel in the proposed sections which shall be indicated by RailTel's representative.

11. Statutory Deduction

These will be made at source as per the rules prevalent in the area of work.

12. Qualification Criteria

Qualifying criteria under this clause lays down minimum acceptable qualifications in various areas to ensure that qualified tenderer has necessary experience, technical expertise, equipment and financial and human resources to successfully complete the project. Bids from bidder not meeting these qualification criteria shall be summarily rejected.

12.1. The Equipment offered by the OEM or equipment of the same series/family should have satisfactorily working in India for 100G deployment of DWDM system for minimum length of 500Kms for at least 12 months as on date of opening of tender. The certificates from the actual users will have to be submitted along with bid.

12.2 Equipment offered by the OEM or equipment of the same series/family should have been satisfactorily working in India for 100G Alien wavelength deployment in live network over 3rd party DWDM network for minimum length of 500Kms for at least 12 months as on date of opening of tender. Documentary evidence should be submitted with offer. This clause will not be applicable for Adva Equipment since ADVA Equipment is being used in existing DWDM Network of RailTel.

12.3 In case of OEM partner, the tenderer should enclose MAF (Manufacturer Authorization Form) specific to this tender along with the bid. Bid submitted without MAF will not be considered.

Participation in this tender through Authorized partner is permitted subject to the following conditions:

The partner shall submit required documentary proofs to establish the tender following eligibility criteria.

i. The tenderer should present at least one (1) project worth at least 35% of tendered value showcasing Supply, installation, testing, commissioning, and maintenance of DWDM Infrastructure Solution commercially in India during last preceding 3 financial years (i.e. current year plus three previous financial years).

Copy of work orders supported with relevant documentary evidences for the same and the completion certificates by the client. Documentary evidence should clearly indicate the nature of systems implemented for each project.

ii) The sum total of the turnover (i.e. revenue from operations) during the last preceding 3 financial years (i.e. current year plus three previous financial years) from the date of opening of tender should be Minimum 150% of the tendered value.

15. System Performance Guarantee

15.1. The tenderer shall give unqualified and unconditional guarantee that when the equipment / material supplied by him is installed and commissioned at site, it shall achieve the desired objective and that in the event of performance of the system when installed not complying with the end objective or with the specifications, he shall provide further inputs to enable the RailTel to realize the end objectives with full compliance of the specifications contained in these documents. No additional payment will be made to the contractor for supply of any additional goods and service required in this regard.

15.2. This certificate in the Proforma given in Chapter 6 Form No. 2, shall accompany the final offer. Absence of this certificate which will form part of the agreement shall disqualify the tenderer automatically.

16. Evaluation of Offer

16.1. For the purpose of relative ranking Note I & II of chapter 2 will be taken into consideration.

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

16.3. The tenderer should make available the offered products, if desired during technical evaluation of offered equipment for testing and benchmarking at any testing facility approved by RailTel.

16.4. The bidders should quote for all items & the offer will be evaluated in totality. The bidders should indicate brand name, type/model number of the products offered. Optional items will not be considered for evaluation of offers. The equipment should be supplied as per Technical Specifications given in Chapter-3.

16.5 Price bid will be opened only for the technically qualified bidders. Bid evaluation will be done based on the quote received as per **Note II 1.A of Chapter-2 SOR.** Inter se position of the offers will be determined on total unit rate on CIP destination basis which will include basic rate, custom duty, CGST, SGST, IGST, GST, freight, insurance and any other charge or cost quoted by the tenderer, including GST payable on reverse charge by RailTel, wherever applicable.

17. Security Considerations & Security Agreement

17.1 While evaluating the tender, regards would be paid to National Defence and Security considerations.

17.2 The directives issued from time to time by the Department of Telecommunications (DoT), Ministry of Communications and IT or any other Ministry of Govt. of India on security considerations shall be applicable to the present tender. Accordingly, as per the extent amendment of the National Long Distance (NLD) Service License Agreement for Security related concerns for expansion of Telecom Services in various zones of the country issued vide Department of Telecommunication, Ministry of Communication and IT, Govt. of India's letter no. 10-54/2010-CS-III (NLD) dated: 31.05.2011, the successful tenderer (OEM) shall comply with the provisions stated in the above mentioned directive of DoT and shall have to enter into an agreement with RailTel as per the mutual agreement between Telecom Service Provider and the vendor of equipment, product and services (based on template, available on DoT website), covering all relevant clauses. The tenderer must submit a declaration along with their bid in this regard.

17.3 The Network for customers

The DWDM network is being provided primarily to meet the requirement of NIC for National knowledge Network and further requirement of defence and other strategic sectors of Government. Accordingly, the DWDM network shall take into consideration the National Security requirement and National Security aspects indicated by these key customers.

18. Purchaser's Right to Vary Quantities

18.1 The purchaser shall be at liberty to enhance or reduce the quantity mentioned in the LOA/Sub PO/PO as indicated in Bid Data Sheet (BDS) Chapter 5 without assigning any reasons. The bidder shall comply with such modifications unconditionally provided these are made before completion of the deliveries under the purchase

order/LOA. Any such change in quantity shall have no impact on the rates mentioned in the purchase order/LOA for any such item.

18.2 RailTel, if required, may enter into Rate Contract with the firm to whom the contract is awarded for catering to additional requirement of Equipment & Cards as and when arise in future. Rate Contract on the successful tenderer would be placed separately and would be operative from the date of PAC of the first section and would be valid for a period of 12 months. The validity of rate contract may be extended for further 12 months with mutual agreement. This Rate Contract would be at the same rates as finalized in main contract. During the validity of Rate Contract, RailTel will place Sub Purchase Orders for Equipment & Cards detailed in SOR, as per requirement. The total value of all the Sub Purchase Orders under Rate Contract shall be restricted to 50% of the contract value for these SOR items, however, there is no guaranteed off take against this Rate Contract. A standing Performance Bank Guarantee of Rs. 10 lakh for due fulfillment of the rate contract with validity of four months beyond contract period will be submitted by the tenderer within 30 days of issue of LOA for Rate Contract. The supplier shall have to supply the equipment & cards against these Sub Purchase Orders within 45 days from the date of issue of such Sub Purchase Orders and should submit a Performance Bank Guarantee (PBG) within 30 days of the issue of such Sub Purchase orders @ 10% of the value (rounded off to nearest Thousand of Rupees) of the Sub PO as per proforma given in Chapter 6, Form No.1. The PBG submitted against Sub P.O. is for the satisfactory performance of materials and should be valid for a period of 4 months beyond warranty period. Terms & conditions of this tender document will be applicable for the Sub POs issued against rate Contract, if any. If the delivery period gets extended, the PBG should also be extended appropriately

The payment conditions against Rate Contract will be as under:

18.2.1 75% of the payment at the time of delivery;

18.2.2 Additional 15% of the payment at the time of delivery, if installation is not included in PO/LOA. In case if installation is included, the terms will remain same as in clause 5 of this Chapter-4.

18.2.3 Additional 5% of the payment at the time of delivery, if installation is not included in PO/LOA. In case if installation is included, the terms will remain same as in clause 5 of this Chapter-4.

18.2.4 5% of the payment after expiry of one year from the date of delivery, if installation is not included in PO/LOA. In case if installation is included, the terms will remain same as in clause 5 of this Chapter-4.

19. Purchaser's Right to accept any offer / Bid and to reject any or all offer/ Bid

19.1 The Purchaser reserves the right to accept or reject any offer / bid, and to annul the bidding process and reject all offers / bids, at any time prior to award of order without assigning any reason whatsoever and without thereby incurring any liability to the affected bidder or bidders on the grounds for the Purchaser's action.

20. Execution of Purchase Order /LOA

20.1 The successful bidder has to submit the copy of the Purchase order/LOA duly signed on each page including Annexure & will submit the Performance Bank Guarantee as per Clause no. 6 for due fulfillment of the PO/LOA.

20.2 If the successful bidder fails to submit the accepted copy of PO/LOA and required PBG within 15 days from the date of issue, it shall constitute a breach of the agreement affected by the acceptance of the tender in which case the full value of the earnest money accompanying the tender shall stand forfeited without prejudice to any other rights or remedies. The Tenderer shall also submit the Type Test documents, FAT plan, Implementation plan etc, within this 15 days period.

20.3 In the event of any tenderer whose tender is accepted and refuses to execute the PO/LOA as herein before provided, RailTel may determine that such tenderer has abandoned the Purchase Order/LOA and thereupon his tender and acceptance thereof shall be treated as cancelled and RailTel shall be entitled to forfeit the full amount of the Earnest Money and to recover the damages for such default.

21. Annulment of Award

Failure of the successful bidder to comply with the requirement of various clauses of tender document shall constitute sufficient ground for the annulment of the award and forfeiture of EMD in which event the Purchaser may make the award to any other bidder at the discretion of the Purchaser or call for new offers/ bids.

22. Earnest Money Deposit (EMD)/ Bid Security

22.1 The tenderer shall furnish a sum as given in Bid Data Sheet (BDS) Chapter 5 as Earnest Money in the form of Demand Draft from any scheduled bank in India in favour of "**RailTel Corporation of India Ltd.," payable at Secunderabad** which should remain valid for 45 days beyond the bid opening date.

22.2 The EMD may be forfeited if a bidder withdraws his offer or modifies the terms and conditions of the offer during validity period and in the case of a successful bidder, if the bidder fails to accept the Purchase order/LOA and fails to furnish performance bank guarantee (security deposit) in accordance with clause 6.

22.3 Offers not accompanied with Earnest Money shall be summarily rejected.

22.4 Earnest Money of the unsuccessful bidder will be discharged / returned as promptly as possible but not later than 30 days after the expiry of the period of offer / bid validity prescribed by the Purchaser.

22.5 The successful bidder's EMD will be discharged upon the bidder's acceptance of the purchase order/LOA satisfactorily and furnishing the performance bank guarantee in accordance with clause 6.

22.6 Earnest Money will bear no interest.

22.7 **For Micro and Small Enterprises (MSEs)**

22.7.1 Certain benefits/preferential treatment shall be extended to the registered MSEs as per guidelines issued in the latest notification of Ministry of MSME/ Government of India.

22.7.2 MSEs who are interested in availing themselves of these benefits will enclose with their offer the proof of their being MSE registered with any of the agencies mentioned in the notification of Ministry of MSME.

22.7.3 The MSEs must also indicate the terminal validity date of their registration.

22.7.4 Failing 22.7.2 and 22.7.3 above, such offers will not be liable for consideration of benefits detailed in the notification of Government of India.

24. Offer/ Bid Prices

24.1. The bidder shall give the prices indicating all levies and taxes, packing forwarding, freight and insurance etc. The basic unit price and all other components of the price need to be individually indicated against the goods it proposes to supply under the tender document as per schedule given in Chapter 2. The price shall be quoted in Indian Rupees (FOR/CIP destination).

24.2. The breakup of price of each item of SOR in terms of basic Unit price, Custom duty, CGST/SGST/IGST/GST and other taxes and any other Levies/charges already paid or payable by the tenderer shall be quoted in the SOR Chapter 2. Any changes in statutory duties/taxes after opening of technical bid will be to RailTel's account within the contracted delivery period.

24.3 All prices and other information like discounts etc. having a bearing on the price shall be written both in figures and in words in the prescribed offer form (SOR). In case of difference in words and figures, the amount written in words will be taken into consideration. In the event of any discrepancy between total unit cost and total cost, the value shown in total unit cost will be taken for evaluation purpose.

24.4 Fall Clause:- The tenderer shall undertake that in case the tenderer offers same type of material at a lower price to any purchaser including the purchaser, Central/State/ Government Organization or Public Sector Undertaking/Enterprise in India, during the validity of purchase order/LOA, the equal benefit of lower prices will be passed on to RailTel. The tenderer will submit an undertaking to this effect while claiming the payment

25. Clause wise Compliance

25.1. Clause wise compliance statement of complete Tender Document including Schedule of Requirement(Chapter-2), Technical Specifications (Chapter 3), Commercial Terms & Conditions (Chapter 4), Bid Data Sheet(Chapter-5) and Technical Specifications (Chapter 8) shall be enclosed with the offer along with the technical literature of the material and other documents in support of relevant clauses.

26. Inspection

26.1. Pre-shipment / pre-dispatch inspection shall be carried out at manufacturer's / tenderer's works by RailTel's authorized representative. At least part of the material should be offered for inspection within 45 days of issue of confirmed Purchase Order/LOA. Traveling, lodging & boarding expenses of RailTel's representative and charges for 3rd party inspection if any shall be borne by RailTel but necessary facilities to carry out tests/witness inspection shall be provided by the manufacturer/ tenderer, free of cost.

 Tenderer Sign with Seal

26.2 Along with inspection call, the tenderer/manufacturer shall submit details of test procedures, test programme, test parameters together with permitted values, etc., and their Quality Assurance Plan.

26.3 In case material fails during inspection, the fresh lot of material shall be offered without any extra cost, by the manufacturer/tenderer. In such a case, total cost of re-inspection including travel, lodging & boarding of the inspecting officials shall be to manufacturer's/ tenderer's account.

27. Force Majeure

27.1 If during the Agreement, the performance in whole or in part, by either party, of any obligation under this is prevented or delayed, by reason beyond the control of the parties including war, hostility, acts of the public enemy, civic commotion, sabotage, Act of State or direction from Statutory Authority, explosion, epidemic, quarantine restriction, strikes and lockouts (as are not limited to the establishments and facilities of the parties), fire, floods, earthquakes, natural calamities or any act of GOD (hereinafter referred to as EVENTS), provided notice of happenings of any such EVENT is given by the affected party to the other, within twenty one (21) days from date of occurrence thereof, neither party shall have any such claims for damages against the other, in respect of such non-performance or delay in performance. Provided service under this Agreement shall be resumed as soon as practicable, after such EVENT comes to an end or ceases to exist.

27.2 In the event of a Force Majeure, the affected party will be excused from performance during the existence of the Force Majeure. When a Force Majeure occurs, the affected party after notifying the other party will attempt to mitigate the effect of the Force Majeure as much as possible. If such delaying cause shall continue for more than sixty (60) days from the date of the notice stated above, the party injured by the inability of the other to perform shall have the right, upon written notice of thirty (30) days to the other party, to terminate this Agreement. Neither party shall be liable for any breach, claims, damages against the other, in respect of non-performance or delay in performance as a result of Force Majeure leading to such termination.

28. Settlement of Disputes

In case of any dispute concerning this order both the tenderer and RailTel shall try to settle the same amicably through mutual discussion/negotiations. Any unsettled dispute shall be settled in terms of Indian Act of Arbitration and conciliation 1996 or any amendment thereof. Place of arbitration shall be New Delhi. Arbitrator shall be appointed by Chairman & Managing Director, RailTel Corporation of India Limited.

29. Governing Laws:

The APO/Sub PO/Purchase Order shall be interpreted in accordance with the laws of India. The courts at New Delhi shall have exclusive jurisdiction to entertain and try all matters arising out of this contract.

30. Termination for Default

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30.1. The purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default, sent to the Tenderer, terminate this contract in whole or in part.

a) If the tenderer fails to deliver any or all of the goods within the time period(s) specified in the contract.
b) If the tenderer fails to perform any other obligation(s) under the contract; and
c) If the tenderer, in either of the above circumstance(s) does not remedy his failure within a period of 30 days (or such longer period as the Purchaser may authorize in writing) after receipt of the default notice from the Purchaser.

31. Risk & Cost

If the contractor fails to deliver the equipment or honour the contractual commitment within the period fixed for such delivery in the contract, the Purchaser may terminate the Purchase order/LOA/ contract in whole or in part, the Purchaser may proceed to purchase, upon such terms and in such manner as it deems appropriate, goods similar to those undelivered at no risk and cost to contractor. However, the security deposit of tenderer shall be forfeited/ Performance Bank Guarantee shall be encashed. The failed tenderer shall not be permitted to take part in the tender for balance work.

31.1 The Maximum Liability of tenderer to any Loss/Damages to RailTel including Liquidity Damages and Performance Guarantee shall be limited to 100% of Value of contract.

32. Termination for Insolvency

The purchaser may at any time terminate the LOA/Sub PO/PO by giving written notice to the tenderer, without compensation to the tenderer, if the tenderer becomes bankrupt or otherwise insolvent as declared by the competent court provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the Purchaser.

33. Rates During Negotiation

The tenderer/s shall not increase his/their quoted rates including payment terms in case the RailTel Administration negotiates for reduction of rates. Such negotiations shall not amount to cancellation or withdrawal of the original offer and the rates originally quoted will be binding on the tenderer/s.

34. Deleted

35. Submission of Offers

35.1. TENDERING INSTRUCTIONS:

The tender document in original along with the schedule filled in, duly signed and Stamped on all pages, complete in all respects shall be enclosed in an envelope. The Tenderer shall also enclose an undertaking in his offer indicating that he will accept all Terms and conditions of the tender document and have not offered any counter clauses. The envelope shall be sealed and the following Title shall be super scribed on the envelope.

35.2. Tender cover should be addressed to the General Manager/NTP, RailTel Corporation of India Limited, **Plate-A, 6th Floor, Office Tower-2, NBCC Building, East Kidwai Nagar, New Delhi-110023** and should reach this office on or before due date and time as per NIT. The Tender will be opened on the same day at 15:30 hrs. If it is happens to be a holiday, tender will be opened on the next working day.

35.3. Tender sealed and superscripted as mentioned above can also be sent by Courier/Registered Post/ in person, to the above mentioned Office. The Tenders which are received after the time and date specified above shall not be considered. RailTel shall not be held responsible for delays due to Department of Posts/courier agency etc.,

All offers in the prescribed forms should be submitted before the time and date fixed for the receipt of the offers.

35.4. In case the schedule of requirement quoted by tenderer is incomplete with reference to tender document, the offer is liable to be rejected.

35.5. ATTESTATION OF ALTERATION: No scribbling is permissible in the tender documents. Tender containing erasures and alterations in the tender documents are liable to be rejected. Any correction made by the tenderer/ tenderers in his/their entries must be signed (not initialed) by him/them.

35.6 The offer shall be submitted in single packet (Separate envelope for Technical Bid and Price Bid) as per instructions given in chapter-4B.

(a) **"TECHNICAL BID"**; -The bid shall consist of the following:-

1) Offer Letter complete.
2) Signed Copy of Tender Document/ Corrigenda
3) **EMD-Bid Security** in Original, in favour of Railtel Corporation of India, Payable at New Delhi. (with Tender No., Name of Firm & Mob. No. written on back side of DD)
4) **Power of attorney** to be submitted in accordance with Clause-36.5, Chapter-4 of Tender Document.
5) Form No. 7 of Chapter-6, Indemnity Bond.
6) **In case bidder happens to be an eligible MSE**, the documentary evidence for same shall be submitted (clause 22.7, chapter-4).
7) Specific authorization addressed to RailTel from the OEM (Parent Company) for Indian Subsidiary or authorized partner i.e. **Manufacturer Authorization Form** (Clause 12.3, Chapter 4 of Tender Document).
8) Technical proposal, Design document along with the Solution of tenderer in conformity with system requirement of the tenderer, if any.
9) Complete technical data and particulars of the equipment offered, as specified in the Tender papers together with descriptive literature, leaflets, Drawings, if any, complete with list etc.,
10) **System Performance Guarantee** (form no. 2, chapter-6).

Tenderer Sign with Seal

11) **Acceptance for Long Term Maintenance Support** as per Clause 3.5, Chapter-4 of Tender Document (form no. 3, chapter-6).

12) Declaration regarding acceptance of clarification issued from DoT (Clause 17.2, Chapter 4 A of Tender Document).

13) Schedule of Requirements with quantities but with prices blanked out (this will be a replica of price bid with prices blanked out) and detailed Bill of Material including break up costs of common units/cards/backplane/Fan Tray unit etc. for building up the SOR items for supply.

14) Clause wise compliance to tender conditions.

15) Documentary proof of equipment (offered model) being proven in India along with user certificate. (Clause 12.1, 12.2, Chapter 4 of Tender Document)

12) Un-priced list of all possible interfaces/ modules/ cards/WSS/EDFAs/Mux-Demux/SFPs/XFPs etc which the offered equipment can support / required for optimization of the network including synchronization needs, if any, but not ordered by RailTel or not included in the above SOR.

13) Any Other information desired to be submitted by the tenderer.

(b) **"Price Bid"** Shall contain

1) The price bid for "Schedule of requirements" as per Note I & II of Chapter 2 along with "Bill of Material" for each item quoted exactly according to the proforma, as also submitted along with "Technical Bid" as in para 35.5 (a) above**.**

36. Constitution of Firm and power of Attorney

36.1. Any individual(s) signing the tender or other documents connected therewith should specify whether he is signing:-

(a) As sole proprietor of the concern or as attorney of the sole Proprietor.

(b) As a partner or partners of the firm.

(c) As a Director, Manager or Secretary in the case of Limited Company duly authorized by a resolution passed by the Board of Directors or in pursuance of the authority conferred by Memorandum of Association.

36.2. In the case of a firm not registered under the Indian Partnership Act, all the partners or the attorney duly authorized by all of them should sign the tender and all other connected documents. The original Power of Attorney or other documents empowering the individual or individuals to sign should be furnished to the Purchaser for verification, if required.

36.3. The RailTel will not be bound by Power of Attorney granted by the tenderer or by the changes in the composition of the firm made subsequent to the execution of the contract agreement.

36.4. In case where the Power of Attorney partnership deed has not been executed in English, the true and authenticated copies of the translation of the same by Advocate, authorized translators of Courts and Licensed Petition Writers should be supplied by the Contractor(s) while tendering for the work.

36.5. The duly notarized Power of Attorney shall be submitted in original or duly signed.

37. Opening of Tender

37.1. Tenderer's Bid will be opened on specified date & time as mentioned in BDS Chapter 5 of the tender in presence of such Tenderers/ Representatives who choose to be present.

38. Non-Transferability & Non-Refundability

The tender documents are not transferable.

39. Errors, Omissions & Discrepancies

The Contractor(s) shall not take any advantage of any mis-interpretation of the conditions due to typing or any other error and if in doubt, shall bring it to the notice of the purchaser without delay. In case of any contradiction only the printed rules, and books should be followed and no claim for the mis-interpretation shall be entertained.

40. 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.

41. Public Procurement (Preference to Make in India):

The provisions of the Public Procurement (Preference to Make in India) Order 2017 dated June 15, 2017 (and subsequent amendments, if any) by Department of Industrial Policy and Promotion, GoI shall apply to this tender to the extent feasible. The criteria for Capability (verifiable evidence that they have manufacturing capability to manufacture the specified quantity and supply the same with in stipulated time period), Equipment and Manufacturing facilities as well as net worth under the financial standing eligibility criteria shall be applicable to local suppliers also.

42. Updation of Labour data on Railway's shramikkalyan Portal:

A. Contractor is to abide by the provisions of Payment of Wages Act & Minimum Wages Act in terms of clause 54 and 55 of Indian Railways General Condition of Contract. In order to ensure the same, an application has been developed and hosted on website 'www.shramikkalyan.indianrailways.gov.in'. Contractor shall register his firm/company etc. and upload requisite details of labour and their payment in this portal. These details shall be available in public domain. The Registration/updation of Poral shall be done as under:

(a) Contractor shall apply for one-time registration of his company/firm etc. in the Shramikkalyan portal with requisite details subsequent to issue of Letter of Acceptance. Engineer shall approve the contractor's registration on the portal within 7 days of receipt of such request.

(b) Contractor once approved by any Engineer, can create password with login ID (PAN No.) for subsequent use of portal for all LOAs issued in his favour.

(c) The contractor once registered on the portal, shall provide details of his Letter of Acceptance (LoA)/Contract Agreements on shramikkalyan portal within 15 days of issue of any LoA for approval of concerned engineer. Engineer shall update (if required) and approve the details of LoA filled by contractor within 7 days of receipt of such request.

(d) After approval of LOA by Engineer, contractor shall fill the salient details of contract labours engaged in the contract and ensure updating of each wage payment to them on shramikkalyan portal on monthly basis.

(e) It shall be mandatory upon the contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.

B. While processing payment of any 'On Account bill' or 'Final bill' or release of 'Advances' or 'Performance Guarantee / Security deposit', contractor shall submit a certificate to the Engineer or Engineer's representatives that "I have uploaded the correct details of contract labours engaged in connection with this contract and payments made to them during the wage period in Railway's Shramikkalyan portal at 'www.shramikkalyan.indianrailways.gov.in' till _____Month, _____Year."

43. The envelope containing the documents shall be addressed to the Purchaser at the following address duly mentioning Tender No and due date on the envelope:

General Manager/NTP
RailTel Corporation of India Limited,
Plate-A, 6th Floor, Office Tower-2,
NBCC Building, East Kidwai Nagar,
New Delhi-110023

(End of chapter 4A)

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CHAPTER-4

B. INSTRUCTIONS TO THE BIDDERS

General

These are the Special Instructions to the Bidders for Tendering.

1.0 Submission of the bid:

The bidder is required to submit the Technical bid and Price bid in separate cover to RailTel Corporation of India Ltd, RailTel Corporate office, before due date & time of submission of bids specified in this tender document, in a Sealed Envelope. The envelope shall bear (the tender name), the tender number and the words 'DO NOT OPEN BEFORE' (due date & time).

2.0 The bids for Technical and Price bid shall be submitted in single envelop as per instructions given below:

(a) **"TECHNICAL BID"**; -The bid shall consist of the following:-

1) Offer Letter complete.
2) Signed Copy of Tender Document/ Corrigenda
3) **EMD-Bid Security** in Original, in favour of Railtel Corporation of India, Payable at New Delhi. (with Tender No., Name of Firm & Mob. No. written on back side of DD)
4) **Power of attorney** to be submitted in accordance with Clause-36.5, Chapter-4 of Tender Document.
5) Form No. 7 of Chapter-6, Indemnity Bond.
6) **In case bidder happens to be an eligible MSE**, the documentary evidence for same shall be submitted (clause 22.7, chapter-4).
7) Specific authorization addressed to RailTel from the OEM (Parent Company) for Indian Subsidiary or authorized partner i.e. **Manufacturer Authorization Form** (Clause 12.3, Chapter 4 of Tender Document).
8) Technical proposal, Design document along with the Solution of tenderer in conformity with system requirement of the tenderer, if any.
9) Complete technical data and particulars of the equipment offered, as specified in the Tender papers together with descriptive literature, leaflets, Drawings, if any, complete with list etc.,
10) **System Performance Guarantee** (form no. 2, chapter-6).
11) **Acceptance for Long Term Maintenance Support** as per Clause 3.5, Chapter-4 of Tender Document (form no. 3, chapter-6).
12) Declaration regarding acceptance of clarification issued from DoT (Clause 17.2, Chapter 4 A of Tender Document).
13) Schedule of Requirements with quantities but with prices blanked out (this will be a replica of price bid with prices blanked out) and detailed Bill of Material including break

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up costs of common units/cards/backplane/Fan Tray unit etc. for building up the SOR items for supply.

14) Clause wise compliance to tender conditions.

15) Documentary proof of equipment (offered model) being proven in India along with user certificate. (Clause 12.1, 12.2, Chapter 4 of Tender Document)

16) Un-priced list of all possible interfaces/ modules/ cards/WSS/EDFAs/Mux-Demux/SFPs/XFPs etc which the offered equipment can support / required for optimization of the network including synchronization needs, if any, but not ordered by RailTel or not included in the above SOR.

17) Any Other information desired to be submitted by the tenderer.

a) **"Price Bid"** Shall contain

1) The price bid for "Schedule of requirements" as per Note I & II of Chapter 2 along with "Bill of Material" for each item quoted exactly according to the proforma, as also submitted along with "Technical Bid"**.**

3.0 Fax Quotations & Late Tenders:

Fax Tender documents and Late/Delayed tenders would not be considered.

4.0 Attendance of Representatives for Tender Opening:

Representatives of tenderers desirous to attend the tender opening can do so on production of a proper letter of authority from the respective firm, failing which they may not be allowed to attend the tender opening.

5.0 Addenda / Corrigenda:

Addenda / Corrigenda to the tender documents may be issued by RailTel prior to the date of opening of the tenders, to clarify or reflect modifications in the contract terms and conditions or in the design. Such addendum/corrigendum shall be available on RailTel Website. Tenderers who are unable or unwilling to bring their tenders to conform to the requirements of the RailTel are liable to be rejected.

6.0 Bid submission and Opening date

1. The bid should be submitted along with Technical & Price bid document (all documents).
2. EMD should be enclosed in an envelope and submitted physically to the tendering authority before the due date and time of submission.
3. Power of attorney in favour of the signatory duly authorizing the signatory shall be submitted.
4. The tenderer's bids will be opened at the time & date of opening of the tender given in the Bid Data Sheet (BDS) in presence of such Tenderers/ Representatives who choose to be present.
5. Bids received after due date and time shall be summarily rejected and shall not be opened.

(End of Chapter 4B)

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CHAPTER- 5

BID DATA SHEET (BDS)

The section consists of provisions that are specific to various Clauses of the tender document COMMERCIAL TERMS & CONDITIONS **Chapter 4**.

Clause	Description
Clause **1.2**	**Validity of offer** 60 days.
Clause **2.1**	**Warranty** 36 months (comprising of 12 months of Maintenance Supervision vide clause 2.5, between issue of PAC and FAC, followed by 24 months of warranty support under clause 2 & 2.4) .
Clause **3**	**Delivery Period** Delivery within 45 days from date of issue of LOA/Purchase Order.
Clause 6	**Performance Bank Guarantee (Security Deposit)** Performance Bank Guarantee of 10% of total value of the LOA is required to be submitted within 30 days of issue of LOA. Validity of this PBG shall be 42 months from the date of issue of LOA to cover Warranty Period and Delivery Period.
Clause **12.1**	The Equipment offered by the OEM or equipment of the same series/family should have satisfactorily working in India for 100G deployment of DWDM system for minimum length of 500Kms for at least 12 months as on date of opening of tender. The certificates from the actual users will have to be submitted along with bid.
Clause **12.2**	Equipment offered by the OEM or equipment of the same series/family should have been satisfactorily working in India for 100G Alien wavelength deployment in live network over 3rd party DWDM network for minimum length of 500Kms for at least 12 months as on date of opening of tender. Documentary evidence should be submitted with offer. This clause will not be applicable for Adva Equipment since ADVA Equipment is being used in existing DWDM Network of RailTel.
Clause **18.1**	**Purchaser's Right to Vary Quantities** up to a maximum extent of +/- 30% of contract quantity.
Clause **22.1**	**Earnest Money Deposit (EMD)/ Bid Security** **Rs. 7,52,500/-**
Clause **37.1**	**Date of Opening of Tender** **Date: 17.01.2020 Time: 15:30 hours** Venue: RailTel Corp of India Ltd, Plate-A, 6th Floor, Office Tower-2, NBCC Building, East Kidwai Nagar, New Delhi-110023.

Note: If the details given in BDS contradict with referred clause in the detailed tender document, the details in BDS will have overriding priority over the referred clause in the tender document.

(End of Chapter 5)

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CHAPTER- 6

Form No. 1

PROFORMA FOR PERFORMANCE BANK GUARANTEE BOND

(On Stamp Paper of Rs one hundred)
(To be used by approved Scheduled Banks)

1. In consideration of the RailTel Corporation of India Limited., having its registered office at Plate-A, 6th Floor, Office Tower-2, NBCC Building, East Kidwai Nagar, New Delhi-110023 (Herein after called RailTel) having agreed to exempt ……(Hereinafter called "the said Contractor(s)") from the demand, under the terms and conditions of an Purchase Order/LOA No.……dated……made between……and…….. for (hereinafter called " the said Agreement") of security deposit for the due fulfillment by the said Contractor (s) of the terms and conditions contained in the said Agreement, on production of a Bank Guarantee for Rs. ……(Rs …….. only). We …… (indicate the name of the Bank) hereinafter referred to as "the Bank") at the request of ……. ……. 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 do hereby undertake to pay the amounts 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 undertake to pay to the RailTel any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) / Tenderer(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 there under and the Contractor(s) / Tenderer(s) shall have no claim against us for making such payment.

4. We, ……. Bank 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.

Tenderer Sign with Seal

5. We,…… (indicate the name of Bank) 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.

This Guarantee will not be discharged due to the change in the Constitution of the Bank or the Contractor(s) / Tenderer(s).

(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.

9.6.1.1.1 Dated the day of 2016

for ……..
(indicate the name of the Bank)

Witness

1. Signature
   Name

2. Signature
   Name

Form No. 2

PROFORMA FOR THE SYSTEM PERFORMANCE GUARANTEE
(On Stamp Paper of Rs. one hundred)

The Director,
RailTel Corporation of India Limited

I / We ……. hereby guarantee that the design on the basis of which we have submitted our tender no. …… has been carefully made to conform to the end objectives in the tender documents and to technical specification therein. We further guarantee that in the event of the performance of the system, when installed, not complying with the end objectives or with the specifications contained in the tender documents, we shall provide further inputs to enable the RailTel to realize the end objectives contained in these documents without any additional payment for any additional equipment which may be required in this regard. We further guarantee that all the expenses for providing the additional inputs under the System Guarantee will be borne by us. We further guarantee that these additional inputs will be provided by us to make the system workable within 1 month from the date on which this guarantee is invoked by the Purchaser. The guarantee is valid for a period of one year from the date of commissioning of the system.

(Signature of Firm's Authorized Officer)
Seal

Signature of witness:

1. …….

2. …….

Tenderer Sign with Seal

Form No. 3

PROFORMA FOR THE LONG TERM MAINTENANCE SUPPORT
(To be signed by the O.E.M.)

To

The Director,
RailTel Corporation of India Limited

I / We ……. hereby confirm and accept that against RailTel Tender No. …….., the requirement of Long Term Maintenance Support as per Clause 3 of Chapter-4 shall be met **by us directly or through our subsidiary in India** as per rates quoted in the Price Bid. I / We have gone through the requirement mentioned in the Tender document and shall provide services as per terms and conditions pertaining to Long Term Maintenance Support of tender document.

(Signature of Firm's Authorized Officer)
Seal

Signature of witness:

1. ……

2. …….

Tenderer Sign with Seal

Form No. 4

CHECKLIST OF ESSENTIAL DOCUMENTATION/ACTIVITY

Note: Tenderer is required to submit offer as per following check list by giving page no. of submitted documents

SN	Item/Clause of Tender Document	Details/Remarks
1	Signed Copy of Tender Document/ Corrigenda	
2	Details of DD(Cost of EMD)	
3	Offer Letter duly signed by authorized signatory (Chapter -1 of Tender Document)	
4	Specific authorization addressed to RailTel from the OEM(Parent Company) for Indian Subsidiary or authorized partner. (Clause 12.3, Chapter 4 of Tender Document)	
5	Power of Attorney to Signing the Bid (Clause 36.2, Chapter 4 of Tender Document)	
6	Clause wise compliance	
7	Declaration regarding acceptance of clarification issued from DoT for Latest Security Clause which includes sign of Agreement between RailTel & Vendor/OEM (Clause 17.2, Chapter 4 of Tender Document)	
8	Form no. 2(System Performance Guarantee) (Clause 15.2 Chapter 4 of Tender Document)	
9	Form no. 3 (Undertaking for Long Term Maintenance Support from OEM) (Clause 3.5, Chapter-4 of Tender Document)	
10	Documentary proof of equipment (offered model) being proven and working for more than 12 months in India along with user certificate (Clause 12.1, 12.2, Chapter 4 of Tender Document)	
11	Complete technical data and particulars of the equipment offered, as specified in the Tender papers together with descriptive literature, leaflets, Drawings, if any, complete with list etc.	
12	**Form No. 7 of Chapter-6**, Indemnity Bond.	
13	Schedule of Requirements (with Price)	
14	Unit rate analysis of each SOR item with break-up of taxes/duties as per proforma attached as Annexure- A, B and C of Chapter2)	
15	Bill of Material(BOM) with prices of each module/cards	

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SN	Item/Clause of Tender Document	Details/Remarks
16	Unit rate of all possible interfaces/ modules/ cards/DCMs/ EDFAs/ Mux-Demux/SFPs/XFPs etc which the offered equipment can support / required for optimization of the network including synchronization needs, if any, **but not ordered by RailTel or not included in the above SOR**	

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Form No. 5

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Tenderer Sign with Seal

Form No. 6

Format for instruction to be provided by vendor/contractor for RTGS payment to be made to them by RailTel against tenders.

Date:

To
M/s. RailTel Corporation of India Ltd.
Plate-A, 6th Floor, Office Tower-2,
NBCC Building, East Kidwai Nagar,
New Delhi-110023.

Dear Sir,

Re: Option for payment of our bills/dues relating to tenders floated by RailTel.

Kindly refer to tender no._____ dated _____
Which was awarded /participated to / by our company as per your award letter no. _____ dated _____ .Against the above PO/LOA participated/awarded to us, we authorize you make payment of dues/bills to us in RTGS/EFT mode against the particulars mentioned below:

1. Name of the agency as given in Bank account
2. Name of the Bank
3. Bank Branch & address
4. Bank account no.
5. Bank account type (savings / current/Over Draft)
6. IFSC code
7. NEFT Code
8. Agency's Address
9. Agency's telephone & mobile no.
10. GST Registration Details.

We also enclose herewith a copy of canceled cheque of the above mentioned bank account for verification of particulars.

I hereby declare that the above particulars given above are correct and complete.

Encl: As above.

(Sign & Seal of the Vendor)

Certified that the particulars furnished at item no. 1 to 6 above are correct as per our records.

Signature of Authorized Official from the bank.

Tenderer Sign with Seal

Form No. 7

STANDING INDEMNITY BOND

(For on Account Payments and Stores supplied by RailTel)

(On Stamp paper of Requisite Value)

We, M/s _____ hereby undertake that we hold at our Stores Depot/s at _____ for and on behalf of RailTel Corporation of India Limited in the premises through RGM/RailTel/Southern Region or his successor hereinafter referred to as "the Purchaser" all materials for which 'On Account' payments have been made to us against the Contract for ---------- vide letter of Acceptance/PO of Tender No. **RailTel/Tender/LT/CO/NTP/2019-20/xxx Dated xx.xx.2019** and the materials handed over to us by the Purchaser for all purpose of execution of the said Contract, until such time the materials are duly erected or otherwise handed over to him.

We shall be entirely responsible for the safe custody and protection of said materials against all risk till they are duly delivered as erected equipment to the purchaser or as he may direct otherwise and shall indemnify the Purchaser against any loss, damage or deterioration whatsoever in respect of the said materials while in our possession and against disposal of surplus materials. The said materials shall at all times be open to inspection by any engineer authorized by the Regional General Manager/Southern Region (whose address will be intimated in due course).

Should any loss, damage or deterioration of materials occur or surplus materials disposed off and refund becomes due, the purchaser shall be entitled to recover from us the full cost as per prices included in the Contract (as applicable) and also compensation for such loss or damage, if any, along with the amount to be refunded without prejudice to any other remedies available to him by deduction from any sum due or any sum which at any time hereafter becomes due to us under the said or any other Contract.

In the event of any loss, damage or deterioration as aforesaid the assessment of such loss or damage and the assessment of such compensation therefore would be made by the RGM/RailTel/SR, or his authorized nominee and the said assessments shall be final and binding upon us.

Dated this _____ day of _____

for and on behalf of M/s

_____ (Contractor)

Signature of witness

Name and witness in Block letters

Address

Tenderer Sign with Seal

CHAPTER-7

Annexure-I

Typewise / Regionwise distribution of DWDM Equipment

SN	Region	Type A	Type B	ILA (Type C)	Total
1	Eastern				
2	Northern				
3	Western				
4	Southern				
	Total				

Note: List of stations/locations where above DWDM equipment are to be installed, will be provided to the successful bidder.

Tenderer Sign with Seal

Annexure-II

Detailed standard conditions applicable for the Annual Maintenance Contract (Clause 3.6, Chapter-4A of Tender Document)

1.0 Introduction

This document contains the standard conditions applicable for the Annual Maintenance Contract between RailTel and the Contractor. Contractor is defined as the company whose products/equipments have been deployed over the RailTel telecommunication network and the warranty of these equipments has expired or going to be expire shortly. All the equipments/ cards/ modules given in SOR will be covered under this contract. This Annual Maintenance Contract will cover up the provision of remote services to be provided by the contractor for proper working of Network created through the contractor's equipments. This document will also cover up the Repair and Return services for the rectification of defective modules/cards/parts etc which are the key tools in use for uninterrupted traffic. It also includes the Key performance parameter which will decide the outcome of the contractor within reasonable time frame along with the provision of penalties. This Annual Maintenance Contract will cover the following services:

- **Technical Support service.**
- **Repair and Return Service.**
- **Software Updates.**
- **Dedicated NOC support.**

2.0 Basic Definitions and terminology Used:-

RailTel: RailTel Corporation of India Limited having its registered office at 10th floor, BoB Building, 16 Sansad Marg, New Delhi and Corporate Office at Plot No. 143, Institutional Area, Opposite-Gold Souk, Sector-44, Gurgaon-122003.

Contractor: Contractor means firm/company whom equipments are deployed over the Telecommunication Network of RailTel.

TSC: Technical Support Center created by the Contractor for 2nd level support.

TEC: Telecom Excellence Center created by the contractor for 3rd level support.

WC: Welcome Center of contractor through which the RailTel may interact with contractor.

AR: Assistance Request created by WC of contractor for a specific request of RailTel which will be used for all references until its closure and also for future correspondence.

Maintained Products: Details of equipments with location wise deployment and serial identification numbers to be incorporated in a statement jointly signed by RailTel and Contractor, which will be covered under AMC contract.

Severity Levels:

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Severity Levels are defined as the condition of the system when RailTel submits an Assistance Request (AR). There are three severity levels for reported problems. Severity levels are defined as follows:

"Critical" (also known as Severity Level 1, SL1): The system is inoperative and RailTel's inability to use the product has a critical effect on RailTel's operations. This condition is generally characterized by complete system failure and requires immediate correction.

"Major" (also known as Severity Level 2, SL2): The system is partially inoperative but still usable by RailTel. The inoperative portion of the product severely restricts RailTel's operations, but has a less critical effect than a severity level 1 condition.

"Minor" (also known as Severity Level 3, SL3): The system is usable by RailTel, with little or limited impact to the function of the system. This condition is not critical and does not severely restrict overall RailTel operations.

RailTel shall inform the severity based on above definitions, at the time of opening of AR with Contractor's TSC. If TSC feels to disagree on the severity, may discuss with RailTel on correction of severity. Where parties disagree on the classification of a particular reported problem, RailTel and Contractor's technical contacts will discuss the classification in good faith to reach a mutually acceptable classification. In the event, the parties are unable to reach agreement on the classification, the reported problem shall be classified at the discretion of RailTel.

Key Performance Indicators (KPIs):

The key performance indicators (KPI) established by contractor and RailTel, are dependent on the severity level of the request as reported by RailTel to the TSC through telephone. Contractor's KPIs extend to Maintained Products running on a currently supported software version release only. These are KPIs which will decide the penalties to be imposed on contractor if he fails to achieve the fixed parameter for both remote services and Repair & Return services.

"Response Time" (also known as Specialist Call-back) means the time period from when RailTel first notifies the Contractor's welcome center of a reported problem to when an contractor's expert attempts to contact RailTel via telephone or preferred contact method as defined when submitting the request.

"Restore Time" (also known as Remote Neutralization) means a measure of the length of time from when contractor is contacted and an event is determined to be loss of service and/or functionality affecting, to the time when contractor provides the means to return a system to operational status. This will be applicable only for services impacting cases. Travel time of field's engineers or TSC engineers and spare arrangement times will be excluded in this.

Resolve Time (Also known as Final Resolution Time) means a measure of the length of time from when RailTel first notifies the contractor's welcome center to the time when a solution to address the issue is made available to RailTel. This may or may not occur simultaneously with Restore Time.

Patch Releases/Maintenance Releases:-

"Patch Release" means a software release that contains minor modifications to address a specific problem and help restore a system. A Patch Release may also be known as "Craft Release".

"Maintenance Release" means a software release that contains modifications intended to resolve problems that prevent products from performing up to the manufacturer's technical specification. Typically they are comprised of a collection of Patch Releases. Maintenance Release may also be known as an "Update Release" or a "Point Release".

3.0 Technical Support Service:-

During this AMC period, whenever needed, RailTel may contact the Contractor's Support center (WC) through a dedicated phone no. or e-mail address or Web for every issue or request. The Welcome Center of the Contractor (WC) will be available 24 hours a day and 365 days of the year. Welcome Centre creates the Assistance Request (AR) in the database and this AR will be used for all future correspondence /references and it will route to either for Repair or Return services or to Technical support center (TSCs) for remote assistance. These level 2 services provided through Technical support center may escalate to Technical Experts centre or to OEM dedicated technical support centers (for OEM support for hardware and /or software portion of the products).

The Welcome centre of contractor (WC) keeps track of the assistance request (AR) or part request until closure.

3.1 Contractor's responsibilities:

Contractor shall login RailTel Network in support of product related questions troubleshooting assistance, diagnostic procedures, and Patch & Maintenance Releases, as are made available, to restore and resolve network troubles. The following services will be provided:

3.1.1 Troubleshoot network problems via phone, virtual private network, or modem connection down to Maintained product component level, or sufficiently to the maintained products as the root cause.

3.1.2 Provide technical advice and guidance via telephone or email by Contractor's product specialists located in their Technical Support Centers (TSC). Upon request from RailTel, RailTel will receive information, advice and assistance for the Maintained Products.

3.1.3 Provide Patch & Maintenance Releases for Maintained Products, as provided in accordance with the applicable product software support policy. For selected products noted on Maintained Products Contractor will remotely install software fixes, patches, and updates that may be made available.

3.1.4 For Severity Level Critical (Severity 1) and Major (Severity 2) will restore Maintained Products to operational status by identifying defective hardware components or providing software and/or procedural workarounds, where feasible. All software

workarounds will be licensed subject to the same terms, restrictions, and limitations as contained in the licenses under which the software was acquired.

3.1.5 Not Used.

3.1.6 The Incharge of SDH equipments shall fill up the history sheet containing the statistics about the health of SDH equipments installed at the concerned site and send a report to the NOC, where the contractors engineer is posted, on monthly basis. Based on this history sheet the supplier shall analyze the health report of each site and if something alarming or unusual is noticed, shall advise the field staff of RCIL to take necessary actions for preventive maintenance of such equipments. The Proforma for checking the status/history sheet shall be jointly decided by the contractor and RCIL.

3.1.7 Software Update:

RailTel will be extended the benefits of software updates made by OEM on the installed systems on existing release from time to time to improve performance. If required to restore or rectification of severe problems all the software up-gradation, re-installation will be done by contractor during the period of AMC.

3.2 RailTel Responsibility:-

When reporting an AR, RailTel shall include Severity Level of problem and output of any diagnostic, printed logs, already performed to help reproduce the conditions under which the trouble occurred. Identify site ID or contact number, submitter name & location, callback telephone number and/or email address, system name and location, processor location, type and serial number, and alternate contact.

3.2.1 RailTel will notify contractor in writing immediately of any change in the employment or authorization status of any personnel having authorized access to the Web site.

3.2.2 RailTel will provide remote access to Contractor's TSC to access their network, either through VPN, ISDN or Team viewer.

3.2.3 RailTel will perform first level diagnostics before handing over the ticket to the Contractor. RailTel will share all network layouts, link details etc which may be needed by Contractor to help troubleshooting the issue.

3.2.4 RailTel will provide all necessary documents for repair of cards.

3.2.5 RailTel will provide all necessary technical field support in the form of field technical staff equipped with necessary equipments etc. to give remote access to Contractor.

4.0 <u>Repair and Return Services</u>

4.1 Repair

4.1.1 Contractor's Responsibility:-

- The Contractor will take- over the defective cards/SFPs from each of the RailTel NOC and hand-over the repaired card at the same location. The following activities will be performed by the contractor:

- After receiving a defective part request through Welcome Centre (dedicated phone line or e-mail), the defective part will be taken over by the contractor from each of the RailTel NOC. All the documentation including identification number (Serial number) will be provided by RailTel.

- There will be initial one time activity of all existing faulty cards being repaired by Contractor before commencement of the AMC. AMC will cover only equipments which are in working condition.

- **Delivery Period:** The received defective part will be got repaired by the contractor within 30 days from the date of receiving and will be handed over to RailTel authorized representative at NOC. The contractor will also give probable reason for repeated failure of cards/ modules.

Uninterrupted Network: For smooth and uninterrupted traffic during the repair being carried out by the contractor.

1. RailTel will use its own spare card in the first instance.

2. If contractor fails to return the repaired card within stipulated time of 30 days from the date of receipt then the OK (good conditioned) cards/SFPs/parts etc will be provided by the contractor for the subsequent in this period free of cost till replacement with the repaired card.

3. All transportation, freight and insurance charges will be borne by the contractor.

4. Contractor will keep the record of repair on each defective part/cards/SFP with serial numbers (unique identification) particulars.

4.1.2 RailTel's Responsibility

RailTel will hand over the defective card/SFP/Parts/etc. to the contractor's authorized representative at each of the RailTel NOC along with the following relevant information & documentation.

- Identification/serial number and location of use.
- Fault report document duly filled-in in a format as per requirements of Contractor.
- All relevant documentation including failure description, diagnostic tests results.
- Adequate packing material to protect against reasonable risk of damages.
- Provide all necessary government authorization and documentation necessary to facilitate custom clearance processing.
- Perform a physical check test on the repaired parts.

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4.2 Return

If any part goes beyond repair due to Contractor at the time of repair being carried out, this is to be communicated to RailTel and after agreed upon, it will be labeled as "unworkable". If it will be required to deploy a new part on that location that will be provided by the contractor to RailTel free of cost. To achieve this, contractor is required to always keep adequate spares with it during the period of AMC. However this excludes damaged, spoiled, rusted or misused parts. Any such parts will be not-repairable and no replacements shall be provided by contractor. RailTel will have to purchase fresh spares in case the cards are non repairable due to these reasons.

5.0 Services Level Agreement Values (SLA):

As described above, if the contractor fails to provide the Technical Support Services and Repair services within the reasonable time, the following KPIs will be used.

5.1 Technical Support Services
KPIs & SLA:

Severity Levels/KPIS	Critical	Major	Minor
Respond	1Hr	3Hr	5Hr
Restore	6 Hr	BE	BE

***BE-Best Effort**

5.2 Repair and Return Services

If the contractor fails to return the card with 30 days, the following penalties will be imposed:

Equipment	Duration of repair	Deduction/Penalties
All Modules and accessories	More than 30 days and upto 40 days (from the date of receipt)	10% of the cost of affected part/module
All Modules and accessories	More than 40 days and upto 50 days (from the date of receipt)	25% of the cost of affected part/module
All Modules and accessories	More than 50 days and upto 60 days (from the date of receipt)	75% of the cost of affected part/module
All Modules and accessories	More than 60 days (from the date of receipt)	Full cost of affected part/module

6.0 Dedicated NOC Support

To enforce of fulfillment of support objectives, contractor shall provide two qualified engineers at NOC locations approved by RailTel where contractor network exists during the working day for level 2 support over the period of this contract.

6.1 **Responsibility Matrix of appointed/Resident engineer:**

1. Alarm monitoring at the network management platform

Equipment alarms
Transmission alarms
PM Threshold alarms

2. Network Management misbehaviors and malfunctions.
3. Filtering of alarms based upon service affecting categories and/or predefined alarm reaction lists.
4. Advising field support Engineers for corrective action to be taken.
5. Support from NMS for all planned activities.
6. Generating a Service request to respective vendor for level 2 Activity
7. Follow up with vendor and field engineers to resolve the network issues.
8. Escalation to respective managers for long pending network issues and opened service request with vendor.
9. Generation of weekly report for all service requests opened/closed with vendor
10. Diagnose and work to correct system troubles identified at RailTel's site using the resources made available by RailTel, implement and restore if appropriate and feasible.
11. Conduct day to day operation in accordance to RailTel recommended procedures.

6.2 General Terms and Conditions Applicable

i) The selection of the Engineer will be done by Contractor jointly with RailTel. RailTel will nominate their officer/s for interviewing the candidates.

ii) The above support offerings will be as per RailTel business hours i.e. from 09:30 hrs. to 18:00 hrs from Monday to Friday and 10:00 hrs to 14:00 hrs on Saturday with Sunday as week holiday. The engineer will avail holidays as per RailTel Holiday Calendar.

iii) Normally the services of the engineers will be available during the above mentioned office hours, however on emergency the engineer will be available any time either on telephone or in NOC on call basis. Subsequent compensatory offs will be given to the engineer to avoid overloading of engineer.

iv) The engineer may avail leave as per entitlement governed by Contractor however, in case of planned leave exceeding consecutive three days, suitable relief shall be posted by the firm.

v) The Engineer will not leave HQ without the permission of RailTel.

vi) The Engineer must be equipped with all necessary facilities/equipments such as Laptop, mobile telephone, data card, Internet connection; conveyance accommodation etc.

vii) The prices quoted in SOR do not include any travel/boarding & lodging expenses outside of the working headquarter (decided by RailTel).

viii) In case of requirements from contractor to log in to the system remotely, RailTel would provide adequate data communications facilities, remote access, telephone and modem connections, all in accordance with RailTel's Security policies and procedures, as may be necessary for the proper performance of contractor's obligations.

ix) In case of unsatisfactory service, the Engineer will be withdrawn and replaced by a suitable one with a clear notice of 15 days.

7.0 General Conditions:

7.1 Period of AMC

This Annual Maintenance Contract will be valid for a period of 5 years from the date of issue of LOA for AMC. This period (i.e. 5 years) may be extended further with mutual consent of RailTel and Contractor.

RailTel at its discretion is free to change the location of the equipments installed during the currency of AMC and the contractor shall carry out the AMC with same commercial terms.

7.2 Performance Bank Guarantee:-

The contractor is required to submit a Performance Bank Guarantee (PBG) within 15 days from the date of issue of LOA for AMC @ 10% of the value of the AMC contract's annual value valid for a period of 64 months (4 months beyond the AMC period of 5 years) from the date of issue of LOA. The Proforma for PBG is given in Form No. 1 of tender document. If the AMC period got extended, the PBG will also be extended accordingly.

The performance Bank Guarantee will bear no interest.

7.3 Prices and Taxes:-

- The prices for the services shall be in INR which will be the currency of account invoicing and payment.
- If in respect of the provision of services, Contractor has to pay the additional admissible taxes, the same will be get reimbursed after receiving he documentary proof by RailTel.
- Price will not include the cost of any financing (if any).
- The Octroi/entry tax shall be paid extra as per actual on production of proof of payment/document.

7.4 Payment Terms:-

AMC charges shall be paid on quarterly basis by the respective Executive Director of the concerned Region after successful completion of maintenance within 30 days from the date of invoicing accompanied with Invoice, Monthly trouble ticket report, Monthly repair report subject to any deductions or recovery (which the RailTel may be entitled to make under contract) through RTGS. Monthly reports will be shared with RailTel regularly. Format will mutually decided by RailTel and Contractor.

7.5 Execution of contract

The executive Directors of respective regions or his nominated representatives will be responsible for the execution of the contract under their respective jurisdiction. Certificate regarding proper execution of the AMC along with proposed

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deductions/penalties with reasons thereof shall be prepared for every billing cycle (quarterly) for arranging payment to the contractor.

7.6 Tenderers Address

Tenderer shall state in the tender his postal address fully and clearly. Any communication sent to the Tenderers by post at his said address shall be deemed to have reached the tenderer duly & timely, not withstanding the fact the communication could not reach the tenderer at all or in time for whatever reason. Important documents shall be sent by Registered post.

7.7 Law governing the contract.

The contract shall be governed by the law for the time being in force in the Republic of India. Compliance to regulations and bye-laws-The contractor shall conform to the provision of any statute relating to the works and regulations and bye-laws of any local authority and of any water and lighting companies or undertakings, with whose system the work is proposed to be connected and shall before making any variation from the drawings or the specifications that may be necessitated by so confirming give to the Engineer notice specifying the variation proposed to be made and the reason for making the variation and shall not carry out such variation until he has received instructions from the Engineer in respect thereof. The Contractor shall be bound to give all notices required by statute, regulation or bye-laws as aforesaid and to pay all fees and taxes payable to any authority in respect thereof.

7.8 Force Majeure clause:-

If at any time, during the continuance of this contract, the performance, in whole or part, by either party, of any obligation under this contract shall be prevented or delayed by reason of any war, hostility, act of the public enemy, Civil Commotion, Sabotage, Fires, Floods, Earth quakes, explosions, strikes, epidemics, quarantine restrictions, lockouts, any statute, statutory rules/regulation, order of requisitions issued by any Government Department of Competent Authority or acts of God (here-in-after referred to as event) then provided notice of the happening of any such event is given by either party to the other within twenty one days from the date of occurrence thereof, neither party shall, by reason of such event, be entitled to terminate this contract nor shall either party have any claim for damage against the other in respect of such non-performance or delay in performance, and the obligations under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, Provided further that if the performance in whole or part of any obligation under this contract of prevented or delayed by reason of any such event beyond a period as mutually agreed to by the RailTel and the Contractor after any event or 60 days in the absence of such an agreement whichever is more, either party may at its option to terminate the contract provided also that if the contract is so terminated under this clause the RailTel may at the time of such termination take over from the Contractor at prices as provided for in the contract, all works executed or works under execution.

7.9 Illegal Gratification

Any bribe, commission, gift or advantage given, promised or offered by or on behalf to the contractor or his partner, agent or servant or anyone on his behalf to any officer or

employees of the RailTel, or to any person on his behalf in relation to obtaining or the execution of this or any other contract with the RailTel shall, in addition or any criminal liability which he may incur, subject the contractor to the rescission of the contract and all other contracts with the RailTel and to the payment of any loss or damage resulting from such decision and the RailTel shall be entitled to deduct the amounts so payable from any moneys due to the Contractor (s) under this contract or any other contracts with the RailTel.

The contractor shall not lend or borrow from or have or enter into any monitory dealings or transactions either directly or indirectly with any employee of the RailTel and if he shall do so, the RailTel shall be entitled forthwith to rescind the contract and all other contracts with the RailTel. Any question or dispute as to the commission or any shall offence or compensation payable to the RailTel under this clause shall be settled by the Regional General Manager of RailTel, in such a manner as shall consider fit and sufficient and his decision shall be final and conclusive. In the event of rescission of the contract under this clause, the contractor will not be paid any compensation whatsoever except payment for the work done up to date of rescission.

7.10 LABOUR

Wages to Labour- The contractor shall be responsible to ensure compliance with the provisions of the Minimum Wages Act, 1948 (hereinafter referred to as the "said Act") and the Rules made there-under in respect of any employees directly or through petty contractors or sub contractors employed by him on road construction or in building operations or in stone breaking or stone crushing for the purpose of carrying out this contract. If in compliance with the terms of the contract, the contractor supplied any labour to be used wholly or partly under the direct orders and control of the RailTel whether in connection with any work being executed by the contractor or otherwise for the purpose of the RailTel such labour shall, for the purpose of the clause, still be deemed to be persons employed by the contractor. If any moneys shall as a result of any claim or application made under the said Act be directed to be paid by the RailTel, such moneys shall be deemed to be moneys payable to the RailTel by the Contractor and on failure by the contractor to repay any moneys paid by it as aforesaid with seven days after the same shall have been demanded, the RailTel shall be entitled to recover the same form any moneys due or accruing to the contractor under this or any other contractor with the RailTel.

7.13.1 Apprentices Act

The contractor shall be responsible to ensure compliance with the provisions of the Apprentices Act 1961 and the Rules and Orders issued the re-under from time to time in respect of apprentices directly through petty contractors or sub-contractors employed by him for purpose of carrying out the contract. If the Contractor directly or through petty contractor or sub-contractors fails to do so, his failure will be breach of the contract and the RailTel may, in its discretion, rescind the contract. The Contractor shall also be liable for any pecuniary liability arising on account of any violation of the provisions of the Act.

7.13.2 Provisions of Payments of Wages Act

The Contractor shall comply with the provisions of the payment of Wages Act, 1936 and the rules made there under in respect of all employees directly or through petty

contractors or sub-contractors employed by him in the works. If in compliance with the terms of the contract, the contractor directly or through petty contractors or sub-contractors shall supply any labour to be used wholly or partly under the direct orders and control of the Engineer whether in connection with the works to be executed hereunder or otherwise for the purpose of the Engineer such labour shall nevertheless be deemed to comprise persons employed by the contractor, and any moneys which may be ordered to be paid by the Engineers shall be deemed to be moneys payable by the Engineer on moneys due to the contractor in terms of the contractor (whether under this contract or any other contract all moneys paid or payable by the RailTel by way of compensation of aforesaid or for costs of expenses in connection with any claim thereto and the decision of the Engineer upon any question arising out of the effect or force of this clause shall be final and binding upon the contractor.

7.13.3 Provision of Contract Labour (Regulation and Abolition) Act 1970

1. The contractor shall comply with the provision of the Contract Labour (Regulation and Abolition) Act 1970 and the Contract Labour (Regulation and Abolition) Act, Central Rules 1971 as modified from time to time, whenever applicable and shall also indemnify the RailTel from and against any claims under the aforesaid Act and the Rules.

2. The contractor shall obtain a valid license under the aforesaid Act as modified from time to time before the commencement of the work and continue to have a valid license until the completion of the work. Any failure to fulfill this requirement shall attract the penal provision of the Contract arising out of the resultant non-execution of the work.

3. The contractor shall pay to the labour employed by him directly or through sub-contractors the wages as per provisions of the aforesaid Act and the Rules wherever applicable. The Contractor shall notwithstanding the provisions of the contract to the contrary, cause to be paid the wages to labour indirectly engaged on the work including any engaged by his sub contractors in connection with the said work, as if the labour had been immediately employed by him.

4. In respect of all labour directly or indirectly employed in the work for performance of the contractor's part of the contract the contractor shall comply with or cause to be complied with the provisions of the aforesaid Act and the Rules wherever applicable.

5. In every case in which, by virtue of the provisions of the aforesaid Act or the Rules, the RailTel is obliged to pay any amount of wages to a workmen employed by the contractor or his sub-contractor in execution of the work or to incur any expenditure in providing welfare and health amenities required to be provided under the aforesaid Act and the Rules or to incur any expenditure in providing welfare and health amenities required to be provided under the aforesaid Act the Rules or to incur any expenditure on account of the contingent liability of the RailTel due to contractor's failure to fulfill his statutory obligations under the

aforesaid Act or the Rules the RailTel will recover from the contractor, the amount of wages so paid or the amount of expenditure so incurred, and without prejudice to the rights of the RailTel under section 20, sub section (2) and section 2 sub-section (4) of the aforesaid Act, the RailTel shall be at liberty to recover such amount or part thereof by deducting it from the security deposit and/or from any sum due by the RailTel to the contractor whether under the contract or otherwise. The RailTel shall not be bound to contest any claim made against it under sub section (1) of section 20 and sub section (4) of section 21 of the aforesaid Act except on the written request of the contractor and upon his giving to the RailTel full security for all costs for which the RailTel might become liable in contesting such claim. The decision of the RailTel regarding the amount actually recoverable from the contractor as stated above shall be final and binding on the contractor.

7.13.4 Reporting of Accidents to Labor

The contractor shall be responsible for the safety of all employees directly or through petty contractors or sub-contractors employed by him on the works and shall report serious accidents to any of them however and wherever occurring on the works to the Engineer or the Engineer's representative and shall make every arrangement to render all possible assistance.

7.13.5 Provisions of Workmen's Compensation Act

In every case, in which by virtue of the provision of section 12 sub section (1) of the Workmen's Compensation Act, 1923, RailTel is obliged to pay compensation to workman directly or through the petty contractor employed by the contractor or sub-contractor, in executing the work, RailTel will recover from the contractor the amount of the compensation so paid, and without prejudice to the right of RailTel under section 12 sub section (2) of the said Act. RailTel shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by RailTel to the Contractor whether under these conditions or otherwise, RailTel shall not be bound to contest any claim made against it under Section 12, Sub Section (1) of the said Act except on the written request of the contractor and upon his giving to RailTel full security for the all costs for which RailTel might become liable in consequence of contesting such claim.

7.11 Determination of Contract

Right of RailTel to determine the contract: The RailTel shall be entitled to determine and terminate the contract at any time, should in the RailTel's opinion, the cessation of the work becomes necessary owing to paucity of funds or from any other cause whatever, in which case the value of approved materials at site and of work done to date by the Contractor will be paid for in full at the rate specified in the contract. Notice in writing from the RailTel of such determination and the reasons thereof shall be conclusive evidence thereof.

Payment on determination of contract: Should the contract be determined under sub clause (1) of this clause and the Contractor claims payment for expenditure incurred by him in the expectation of completing the whole of the work, the RailTel shall admit and consider such claims as are deemed reasonable and are supported by vouchers to the

satisfactions of the Engineer. The RailTel's decision on the necessity and property of such expenditure shall be final and conclusive.

The contractor shall have no claim to any payment of compensation of otherwise, however on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequence of determination of contract.

7.12 TERMINATION OF CONTRACT OWING TO DEFAULT OF CONTRACTOR:

As per clause 30, chapter-4 of tender document.

7.13 RIGHT OF RAILTEL AFTER TERMINATION OF CONTRACT OWING TO DEFAULT OF CONTRACTOR :

a) The contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any commitments or made any advances on account of or with a view to the execution of the works or the performance of the contract and contractor shall not be entitled to recover or be paid any sum for any works thereto not actually performed under the contract, unless or until the Engineer shall have certified the performance of such work and the value payable in respect thereof and the Contractor shall only be entitled to be paid the value so certified.

b) The Engineer or Engineer's Representative shall be entitled to take possession of any materials, tools, implements, machinery or buildings on the works or on the property on which these are being or ought to have been executed, and to retain the employ the same in further execution of the works without the contractor being entitled to any compensation for the use and employment thereof or for wear and tear or destruction thereof.

c) The Engineer shall, as soon as may be practicable after removal of the contractor fix and determine expert or by or after reference to the parties or after such investigation or enquiries as he may consider fit to make or institute and shall certify what amount (if any) has at the time of termination of the contract been reasonably earned by or would reasonably accrue to the Contractor in respect of the work then actually done by him under the contract what was the value of any unused or partially use materials, any constructional plants and any temporary works upon the site. The legitimate amount due to the contractor after making necessary deductions and certified by the Engineer should be released expeditiously.

7.14 SETTLEMENT OF DISPUTE AND ARBITRATION:-

- Any dispute or difference whatsoever arising between the parties out of relating to the construction, meaning, scope, operation or effect of this contract or the validity or the breach thereof shall be settled by a sole arbitrator in accordance with provisions contained in Arbitration and Conciliation Act, 1996 as amended and the award made in

pursuance thereof shall be binding on the parties. The venue of such arbitration or proceedings thereof shall be New Delhi.

- All arbitration proceedings shall be conducted in English. Resources against any Arbitral award so rendered may be entered into court having jurisdiction or application may be made to such court for the order of enforcement as the case may be.

- The arbitral tribunal shall consist of the sole Arbitrator if the value of claim is upto Rs. 10 lakhs. The arbitrator will be appointed by the Managing Director of RailTel Corporation of India Ltd. If the value of claim or amount under dispute is more than Rs. 10 lakhs, the matter shall be referred to the adjudication of arbitral council. Managing Director/RailTel shall furnish a panel of three names to the contractor, out of which the contractor will recommend one name to be his nominee and then Managing Director/RailTel shall appoint out the panel, one name as RailTel's nominee and these two arbitrators with mutual consent appoint a third arbitrator who shall act as deciding. The award of sole arbitrator or Arbitral council, as the case may be, shall be final and binding on both the parties, i.e. contractor and RailTel Corporation of India Ltd.

- Each of the parties agree that no withstanding that the matter may be referred to Arbitrator as provided therein, the parties shall nevertheless pending the resolution of the controversy or disagreement continue to fulfill their obligation under this agreement so far as they are reasonably able to do so.

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CHAPTER- 8

A. DWDM Technical Specifications

1.0 RailTel Solution Requirements:

The System Configurations of DWDM Equipments are described in chapter 3A. the general specifications of the DWDM system to be offered is mentioned in this chapter.

1.1 General

1.1.1 DWDM system shall support different network topologies e.g., multi-node ring, mesh, star, chain etc.

1.1.2 The proposed solution shall support minimum 8 channels of 100G in C- Band on a single fiber pair.

1.1.3 The proposed solution shall be able to scale in increments of one wavelength without service channel interruption.

1.1.4 System shall support in-service software upgrade. DWDM solution shall support an in-service upgrade from a linear topology to a ring to a mesh topology.

1.1.5 The System should have universal slots.

1.1.6 System shall support testing of a wavelength without a client signal being present by supporting on-board Pseudo-Random Bit Stream (PRBS) test pattern generation and Bit Error Rate (BER) measurements on 100G Transponder/Muxponder card type.

1.1.7 System shall support near-end and far-end loop back on every interface card type.

1.2 Modularity

In order to assure minimal initial investment and gradual network upgrade (pay-as-you-grow) as well as an optimal configuration for different network scenarios the platform must support various hardware options.

1.2.1 A single network element (NE) consisting of up to such nos. of shelves (multi-shelf NE) so that maximum traffic (800Gbps) may be dropped at client level.

1.2.2 Larger shelves and smaller shelf configurations shall be able to interwork at the DWDM layer.

1.2.3 Small and large systems shall use the same pool of interface cards.

1.2.4 A shelf or rack mountable units for passive components like optical filters and DCMs (if required)

1.2.5 Passive and active optical components in form of a pluggable module

1.2.5.1 DWDM optical channel filter (add/drop multiplexer)

1.2.5.2 DWDM filters for low channel count in form of cable

1.2.5.3 Optical amplifier (PA/Boosters)

1.2.5.4 Electronically Variable Optical Attenuator (EVOA)

1.3 Transponders & Muxponders

1.3.1 10G Muxponder

1.3.1.1 10G Muxponder shall support several ports with OC-3/STM-1, OC-12/STM-4, OC-48/STM-16, OUT1 client rates.

1.3.1.2 10G Muxponder shall support any-rate SFP modules that can be flexibly provisioned to all above mentioned data rates. All client ports shall support flexible configurations i.e. it shall be possible to configure some ports on SDH client, some ports on packet client at the same time.

1.3.1.3 10G Muxponder shall support minimum 8xany-rate client ports and 1x10G DWDM line ports.

1.3.1.4 10G Muxponders shall support OUT2 DWDM line rates.

1.3.1.5 10G Muxponders shall support pluggable interfaces for both client side interface and DWDM line side interfaces.

1.3.1.6 10G Muxponder shall support tunable line pluggable across entire C-Band.

1.3.1.7 10G Muxponders should support fixed DWDM line pluggable and the variants/wavelengths available for fixed line pluggable.

1.3.1.8 10G Muxponders shall have G.709 GFEC & G.975.1 I.4 EFEC options. It shall be possible to disable the FEC for low latency applications.

1.3.1.9 10G Muxponder shall support an integrated PRBS test generator and loop-back capabilities.

1.3.2 100G Transponder & Muxponder

1.3.2.1 100G Transponder shall support 100GbE &OTU4 client rates with the same plugable/fixed module.

1.3.2.2 100G Muxponder shall support 10x10G client ports. 10G client shall support 10GbE LAN-PHY, OC-192, STM-64, 10G WAN-PHY, 10G FC, OUT2 &OUT2e data rates with same XFP/SFP+ modules.

1.3.2.3 All client ports shall support flexible configurations i.e. it shall be possible to configure all client ports in any mix of all supported client rates at the same time.

1.3.2.4 100G Transponder and Muxponders shall support OTU4 DWDM line rate.

1.3.2.5 100G Transponders and Muxponders shall support pluggable/fixed interfaces for all client side and line side interface.

1.3.2.6 100G Transponder and Muxponder shall support integrated PRBS test generators and loop-back capabilities.

1.3.2.7 System should support Optical channel/path protection at DWDM line side or client side.

1.4 Pluggable Optics

1.4.1 System shall support SFP with following client side services & specified reach 10G on Muxponder:

1.4.1.1 STM-1/OC-3 (IR-1, 1310 nm, SM)

1.4.1.2 STM-1/OC-3 (LR-1, 1310 nm, SM)

1.4.1.3 STM-1/OC-3 Electrical

1.4.1.4 STM-4/OC-12 (IR-1, 1310 nm, SM)

1.4.1.5 STM-4/OC-12 (LR-1, 1310 nm, SM)

1.4.1.6 STM-16/OC-48 (SR-1, 1310 nm, SM)

1.4.1.7 STM-16/OC-48 (IR-1, 1310 nm, SM)

1.4.1.8 STM-16/OC-48 (LR-1, 1310 nm, SM)

1.4.1.9 STM-16/OC-48 (LR-2, 1550 nm, SM)

1.4.1.10 STM-16/OC-48 (IR-2, 14xx/15xx/16xx nm CWDM, SM)

1.4.1.11 GE (SR/SX, 850 nm, MM)

1.4.1.12 GE (LX, 1310 nm, SM)

1.4.1.13 GE (ZX, 1550 nm, SM)

1.4.1.14 GE (IR-2, 14xx/15xx/16xx nm CWDM, SM)

1.4.1.15 GE (80 km, 14xx/15xx/16xx nm CWDM, SM)

1.4.1.16 GE (120 km, 14xx/15xx/16xx nm CWDM, SM)

1.4.1.17 GE Electrical (10/100/1000 BaseT, RJ-45)

1.4.1.18 100BaseFX (2 km, 850 nm, MM)

1.4.1.19 100BaseLX (10 km, 1310 nm, SM)

1.4.1.20 1G FC (SR/SX, 850 nm, MM)

1.4.1.21 1G FC (LX, 1310 nm, SM)

1.4.1.22 1G FC (ZX, 1550 nm, SM)

1.4.1.23 2G FC (SR, 850 nm, MM)

1.4.1.24 4G FC (SR/SX, 850 nm, MM)

1.4.1.25 4G FC (IR-1, 1310 nm, SM)

1.4.1.26 4G FC (LR-1, 1310 nm, SM)

1.4.1.27 FICON (SR/SX, 850 nm, MM)

1.4.1.28 FICON (LX, 1310 nm, SM)

1.4.1.29 FICON (ZX, 1550 nm, SM)

1.4.1.30 ESCON (850 nm, MM)

1.4.1.31 ESCON(SR, 1310 nm, SM)

1.4.1.32 SDI / HD-SDI (Coax Video Transmit)

1.4.1.33 SDI / HD-SDI (Coax Video Receive)

1.4.1.34 SDI / HD-SDI (1310 nm Optical SDI)

1.4.1.35 3G-SDI (3G-SDI Optical Video)

1.4.1.36 1000Base-BX (single mode, single fiber, 10 km, 1310TX / 1490RX)

1.4.1.37 1000Base-BX (single mode, single fiber, 10 km, 1490TX / 1310RX)

1.4.1.38 OTU1 (SR-1, 1310 nm, SM)

1.4.1.39 OTU1 (IR-1, 1310 nm, SM)

1.4.1.40 OTU1 (LR-1, 1310 nm, SM)

1.4.1.41 OTU1 (LR-2, 1550 nm, SM)

1.4.2 System shall support XFP/SFP+ with following client side services & specified reach on 100G Muxponder:

1.4.2.1 STM-64 / OC-192 (SR/SX, 850 nm, MM)

1.4.2.2 STM-64 / OC-192 (SR, 1310 nm, SM)

1.4.2.3 STM-64 / OC-192 (IR-2, 1550 nm, SM)

1.4.2.4 STM-64 / OC-192 (LR-2, 1550 nm, SM)

1.4.2.5 10GbE (SR/SW, 850nm, MM)

1.4.2.6 10GbE (LR/LW, 1310nm, MM)

1.4.2.7 10GbE (ER/EW, 1550nm, MM)

1.4.2.8 10GbE (ZR/ZW, 1550nm, MM)

1.4.2.9 8G FC (SR/SW, 850nm, MM)

1.4.2.10 8G FC (LR/LW, 1310nm, MM)

1.4.2.11 8G FC (ER/EW, 1550nm, MM)

1.4.2.12 8G FC (ZR/ZW, 1550nm, MM)

1.4.2.13 10G FC (SR/SW, 850nm, MM)

1.4.2.14 10G FC (LR/LW, 1310nm, MM)

1.4.2.15 10G FC (ER/EW, 1550nm, MM)

1.4.2.16 10G FC (ZR/ZW, 1550nm, MM)

1.4.2.17 OTU2 / OTU2e (SR, 1310nm, SM)

1.4.2.18 OTU2 / OTU2e (IR-1, 1310nm, SM)

1.4.2.19 OTU2 / OTU2e (IR-2, 1550nm, SM)

1.4.2.20 OTU2 / OTU2e (LR-2, 1550nm, SM)

1.4.3 System shall support CFP/ with following client side services & specified reach on 100G Transponder:

1.4.3.1 100GbE (10km, LR4, 4x25G WDM)

1.4.3.2 OTU4 (100m, SR10, 10x10G Parallel)

1.4.3.3 OTU4 (10km, LR4, 4x25G WDM)

1.4.4 System shall support ‘Grey’ interfaces at the line side.

2.0 Optical Layer Capabilities

2.1 General DWDM Attributes

2.1.1 DWDM system shall be a common platform capable to support all node types: Terminal, OADM, In-Line Amplifier etc.

2.1.2 DWDM system shall support fully amplified, partially amplified and non-amplified operation.

2.1.3 DWDM System shall support Optical Supervisory Channel (OSC) or GCC that is inserted and extracted at each node. All network elements shall be managed through the offered OSC/GCC.

2.1.4 OSC/GCC shall be used as a fast communication channel for sending control, configuration and request messages from Network Management system to the DWDM Network elements. Conversely Alarms, events and responses from the Network elements to the NMS.

2.1.5 The bidder shall have option for establishing "external" DCN (Data Communication Network) connectivity between the NE's and the NMS platform using routers etc.

2.1.6 DWDM system shall be scalable and modular in architecture.

2.1.7 A range of Pluggable EDFA amplifiers shall be available that allows the design of cost-effective solutions.

2.1.8 Range of DWDM filters should be available to give flexibility in designing traffic matrix.

2.1.9 System shall support DCM modules for compensating chromatic dispersion, if required.

2.1.10 DWDM System shall support Dispersion Compensating Modules (DCMs) with a granularity ensuring that a proper compensation can be achieved flexibly.

2.1.11 The DWDM system shall support a variety of Fixed Optical Add-Drop Multiplexer (FOADM) with amplification, without amplifications & has to implement as per network requirement.

2.1.12 System should support co-existence of 10G and 100G wavelengths without guard bands.

3.0 General Fixed-OADM System Attributes

3.1 Product Quality

2.1.1 Product shall be designed for a minimum lifetime of 10 years..

2.1.2 Equipment shall support non traffic affecting upgrade between subsequent product releases.

2.1.3 Equipment shall have fully protected and redundant controller

Architecture if it's failure is traffic affecting. If the failure of controller is not traffic affecting, single controller architecture is also accepted.

3.2 Materials and Environment Protection

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The product shall be compliant to:

2.2.1 Product shell be compliant to RoHS (Restriction of certain Hazardous Substances) requirements:

- European Union (EU) Directive 2002/95/EC (lead-free design should be a long-term goal)

3.3 Mechanical Characteristics

3.3.1 The proposed solution shall fit into standard 19" / ETSI /ANSIrelay racks / cabinets as a standard form factor.

3.3.2 Interfaces of devices or modules must be accessible from the front.

3.3.3 Equipment shall support insertion/extraction of modules without any special tools.

3.3.4 Equipment shall support insertion/extraction of modules without removal of any other module or external connections.

3.3.5 Equipment shall support insertion/extraction of modules without powering down the equipment and shall not affect the existing services.

3.4 Environmental Requirements

The product shall meet following standards and regulations:

3.4.1 Generic requirements defined in ETS 300 019 (environmental criteria)

3.4.2 NEBS level 3

3.4.3 Telcordia GR-3028-CORE: Thermal Management, Telecommunication Central Office

3.4.4 Operation: ETS300 019 Class 3.1

3.4.5 Transport: ETS300 019 Class 2.2

3.4.6 Storage: ETS300 019 Class 1.1

3.4.7 EN300386 Telecommunication centers

3.5 Electromagnetic Compatibility

Compliance with following requirements has to be assured:

3.5.1 ETSI EN 300 386-2: EMC requirements for Telecommunication network equipment

3.6 Safety and Security

3.6.1 The optical equipment shall not pass hazard level 1M for any open connector.

3.6.2 It should be possible from remote to disable the communication port on the NE through TNMS.

3.7 Packaging

3.7.1 The packaging and labelling of components and boards containing ESD (electrostatic discharge) components must meet the relevant requirements as specified in DIN EN 100 015 and comparable international standards.

3.8 Power Supply & Power Consumption

3.8.1 The power supply at rack (from Rectifier to Rack DCDB) and subrack must be redundant.

3.8.2 The equipment shall operate with the input voltage in the range of -40,5VDC to -72VDC.

3.8.3 A measure (protective circuit) shall be taken to prevent a failure from being caused by Positive- Negative reverse application of power.

3.8.4 Tenderer has to indicate the typical and maximum power consumption of each module and complete system.

3.9 Redundancy & Reliability

3.9.1 Software upgrade on the controller card shall not impact traffic.

3.9.2 Equipment shall have redundant power supply. Equipment should be able to run on single power supply without any limitation on the functions or modules supported.

3.9.3 Equipment shall have fan redundancy.

3.9.4 The failure of any individual fan must be signaled both locally and remotely. It must be possible to distinctly identify the place of installation.

3.9.5 For each replaceable unit (module, pluggable, unit etc.) the supplier has to provide MTBF (in years) and FIT (in 10^9 hours) values.

3.10 Documentation

3.10.1 The documentation forming part of the scope of delivery must include all necessary descriptions required for the planning, commissioning and operation of the equipment and management systems.

3.10.2 All product documentation shall be available in English Language.

4.0 Network Management and Monitoring

4.1 Fault Management

4.1.1 Remote fault monitoring shall support fault localization at the field-replaceable unit level.

4.1.2 The system must support alarm logs with min. 1000 entries.

4.1.3 Equipment and service alarms shall be separated.

4.1.4 System shall support Alarm Suppression acc. to ITU G.798.

4.1.5 System shall support Alarm Suppression acc. to ITU G.783 / Telcordia GR-253-CORE.

4.1.6 System shall support Alarm Masking.

4.1.7 System shall support Alarm Timestamps.

4.2 Performance Management

4.2.1 System shall support Performance monitoring according to ITU-T G.709 & G.798.

4.2.2 System shall support preFEC BER monitoring.

4.2.3 System shall support non-intrusive monitor of section acc. GR-253-CORE (B1, J0) for SONET services over OTN.

4.2.4 System shall support non-intrusive monitoring of regenerator section acc. ITU G.783 (B1, J0) for SDH services over OTN.

4.2.5 System shall support Performance monitoring intervals of 15min. and 24h.

4.2.6 System shall support Performance Logs with minimum 96x15min entries and 7x24h entries based on FIFO principle.

4.2.7 System shall support manual reset of performance logs.

4.3 Logs

4.3.1 System shall support logging of configuration commands. Configuration logs shall be stored persistently with minimum 1000 entries.

4.3.2 System shall support logging of security related events (log-in, log-out, wrong password) and security administration events. Security logs shall be stored persistently with minimum 1000 entries.

4.4 Management System

4.4.1 System shall support management via Element management (LCT) and Network Management (NMS).

4.4.2 The controller must provide gateway network element functions which has to be automatically detected by the NMS.

4.4.3 The system shall implement NE management functions according to ITU-T G.7710.

4.4.4 The system shall be able to provide all alarm messages and informational messages to the LCT and NMS.

4.4.5 The system shall support redundant NMS access points and redundant NMS access per NE.

4.4.6 Management system shall support SNMPv3/TL-1 interface.

4.4.7 System shall have external management interfaces for LCT and NMS access.

4.4.8 Management system shall support End to End Provisioning.

4.4.9 Management system shall support Circuit Discovery.

4.4.10 Management system shall support Northbound Interface and shall report Alarm, Inventory, Provisioning data. Describe all the northbound interfaces supported.

4.4.11 Management system shall support small as well as large shelf solutions.

4.4.12 Management System shall provide exportable data tables in .CSV or other parsable text format that can be imported into third party network modeling tools (without the use of additional proprietary or fee-based software options).

4.5 User Management

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4.5.1 System shall support minimum 3 user classes. Supplier shall describe the available user classes and access granted to each class.

4.5.2 System shall have client authorization (user class) and client authentication (password) feature.

4.5.3 Administrator shall be able to enable/disable/configure user accounts.

4.5.4 Administrator shall be able to observe activity of all sessions in real-time.

4.5.5 Administrator shall be able to inquire number of logged-in users and forced logout of any user.

4.5.6 System shall support auto-disable of any user account for a configurable time period after N consecutive unsuccessful login attempts (N should be configurable).

4.5.7 System shall support automatically logout of user upon specified inactivity time period. This time period shall be configurable for each user.

4.5.8 System shall support auto disabling of any user account if the account has not been used for more than a specified time period.

4.5.9 This time period shall be configurable. It shall also be possible to disable this feature.

4.5.10 System shall have password aging function i.e. after the defined time period, user has to change the password.

4.5.11 Password aging time period shall be configurable for each user. It shall also be possible to disable the password aging function.

4.5.12 It shall be supported that password can never be set to a “null” password and shall satisfy minimum complexity rules. Supplier shall describe the password complexity rules.

4.5.13 System shall not allow to use last 5 passwords for a new password for each user.

4.6 Data Communication Network (DCN)

4.6.1 System shall support DCN demarcation from the carrier's DCN (Gateway functionality) that includes the use of individual TCP/IP port management and SFTP client on the NE.

4.6.2 System shall support DCN realization via Optical Supervisory Chanel (OSC) and OTN frame overhead (GCC0, GCC1, and GCC2 channel).

(End of Chapter 8A)

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CHAPTER 8-B

(Specifications of Rack)

SPECIFICATIONS FOR FULL SIZE COVERED ETSI RACK

1. Rack should preferably be of 19"/21" size from equipment manufactures and make or from branded quality manufacturers like APW President or Rittal. In case of any other make, it should be approved by RailTel prior to offering the same for inspection.
2. Approx. external size of rack: 2200H x 600W x 600D excluding top bolted canopy.
3. Dust & water protection to IP41 level should be provided in each rack.
4. 2 pairs of adjustable 19" equipment mounting rails should be provided in each rack.
5. 44U usable space should be there.
6. 3 pairs of depth support rails should be there.
7. Bolted canopy at the top (extending 50mm outside on all four sides).
8. Top and bottom with cable entry cut out & gland plate. Sufficient nos. of holes should be provided at top and bottom of rack with grommets for cable entry.
9. Two integrated (fixed) sides with louvers covered with fine wire mesh from the inside for air entry.
10. 600mm front door with transparent toughened glass fitted on MS sheet on sides with rubber beading, locks & keys.
11. 600mm MS plain rear panel having ventilation holes at bottom side with dust filters. Panel should be bolted and openable via LN key.
12. The minimum thickness of the MS sheet used in manufacturing should be 1.6 mm.
13. Minimum 2 Nos. branded compact 90 CFM fan modules working on 48 V DC properly fitted at top of rack should be provided with each rack.
14. 2 Nos. Vertical and 2 Nos. Horizontal cable managers to be provided with each rack.
15. Rack should have 4 holes for floor grounting and equipped with 4 leveling screws & grounting bolts.
16. The rack should be fitted with one sliding shelf adjustable over the rails of the rack.
17. One 19" rack mounted copper earth bus bar with dimensions 485mm x 25mm x 5mm having 12 holes and 3 brass nut bolts and washers for fixing of earthing cables should be fixed near the bottom of the rack.
18. Overall dimensions are subject to the tolerance of ±5 mm and centre to centre ±2 mm.
19. Rack should be provided with four nos. of adjustable 19" rails of minimum 2mm thickness having holes for fixing equipments throughout the internal height of rack.
20. The rack frame should be MIG welded for increased strength and rigidity.
21. Finish: powder coated light Grey RAL 7035 on outside & powder coated white on the inside.
22. Sufficient nos. of MCBs of rating as per requirement of equipment being supplied should be provided with rack.
23. MCBs should be of Havells or equivalent make.
24. Only copper/Brass hardware to be provided with earthing kit.
25. Transparent Acrailic cover to be provided over MCBs to prevent the accidental operation of MCBs.
26. Rack mounted dual power supply DCDB panel with bolted front cover as per detail given below:

    (i) It should have provision to install up to 12 SP MCBs (6 for each supply).
    (ii) Nut/Bolts for fixing the DCDB on rack (min 4 Nos.)
    (iii) Bolts/Screws for fixing the box cover on base unit (min 4 Nos.)

(iv) Brass make Bolts/Screws for cable fixing on +ve and –ve Bus bar (min 8 Nos.)
(v) Arrangement for fixing MCBs on base unit of distribution box.
(vi) The material should be MS with 1.6mm thickness powder coated in light grey colour.
(vii) Cable entry holes should preferably be provided with suitable soft material (rubber type) to prevent the damage to the cables from hard metal of the box.
(viii) The minimum dimensions of the bus bars should be 25x3mm (02 Nos. for –ve and 01 Nos. for +ve).
(ix) The +ve and –ve bus bars should be painted with red and blue colour respectively all over except near the point of contacts of cable thimbles.

27. Rack drawing along with the model of rack and bill of material shall be submitted by the tenderer as per above specs for approval of RailTel.

(End of Chapter 8B)

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Annexure-X

Segment (Forward Direction)	Segment Type	Fiber Length	Fiber Type	Fiber Loss	Dispersion Tx	Dispersion Rx
Chennai PoP - Gummidipoondi	BB	64.00 Kms	G652D	29.60 dB	No DCG	No DCG
Gummidipoondi - Sullupeta	BB	50.00 Kms	G652D	18.40 dB	No DCG	No DCG
Sullupeta - Gudur	BB	64.00 Kms	G652D	22.70 dB	No DCG	No DCG
Gudur - Nellore	BB	45.00 Kms	G652D	19.40 dB	No DCG	No DCG
Nellore - Kavali	BB	55.00 Kms	G652D	21.60 dB	No DCG	No DCG
Kavali - Ongole	BB	74.00 Kms	G652D	30.20 dB	No DCG	No DCG
Ongole - Bapatla	BB	72.00 Kms	G652D	29.30 dB	No DCG	No DCG
Bapatla - Vijaywada	BB	82.00 Kms	G652D	29.10 dB	No DCG	No DCG
Vijayawada - Eluru	BB	68.00 Kms	G652D	26.80 dB	No DCG	DCG-100
Eluru - Tadepaligudem	BB	56.50 Kms	G652D	26.30 dB	DCG-100	DCG-80
Tadepaligudem - Rajahmundry	BB	49.00 Kms	G652D	18.40 dB	DCG-80	DCG-100
Rajahmundry - Samalkot	BB	57.00 Kms	G652D	25.00 dB	DCG-100	No DCG
Samalkot - Tuni	BB	60.00 Kms	G652D	26.90 dB	No DCG	No DCG
Tuni - Anakapalli	BB	72.00 Kms	G652D	25.60 dB	No DCG	DCG-100
Anakapalli - Vishakhapatnam	BB	42.00 Kms	G652D	22.00 dB	DCG-100	DCF-40
Vishakhapatnam - Vijaynagram	BB	74.00 Kms	G652D	39.10 dB	No DCG	DCG-100
Vijaynagram - Srikakulam Road	BB	76.00 Kms	G652D	36.60 dB	No DCG	No DCG
Srikakulam Road - Palasa	BB	79.00 Kms	G652D	30.30 dB	No DCG	DCG-100
Palasa - Behrampur	BB	82.00 Kms	G652D	30.10 dB	DCG-100	DCG-100
Behrampur - Balugaon	BB	84.20 Kms	G652D	28.90 dB	No DCG	DCG-100
Balugaon - Khurda Rd.	BB	80.30 Kms	G652D	38.60 dB	DCG-100	DCF-40
Khurda Rd. - Bhuvaneshwar	BB	53.20 Kms	G652D	16.70 dB	DCF-40	DCG-100
Bhuvaneshwar - Cuttak	BB	31.30 Kms	G652D	17.10 dB	No DCG	DCG-100
Cuttak - Jajpur	BB	79.20 Kms	G652D	36.00 dB	DCG-100	No DCG
Jajpur - Bhadrak	BB	49.20 Kms	G652D	27.90 dB	No DCG	DCG-80
Bhadrak - Balasore	BB	67.20 Kms	G652D	27.00 dB	DCG-80	No DCG
Balasore - Jaleshwar	BB	52.80 Kms	G652D	20.10 dB	No DCG	DCG-100
Jaleshwar - Kharagpur Jn.	BB	73.40 Kms	G652D	27.00 dB	DCG-100	DCG-100
Kharagpur Jn. - Panskura	BB	48.00 Kms	G652D	24.10 dB	No DCG	No DCG
Panskura - Bagnan	BB	38.00 Kms	G652D	23.70 dB	No DCG	No DCG
Bagnan - Kolkatta	BB	56.50 Kms	G652D	25.00 dB	No DCG	DCG-100
Chennai PoP - Thiruvallur	BB	53.60 Kms	G652D	23.50 dB	No DCG	No DCG
Thiruvallur - Arakkonam	BB	30.00 Kms	G652D	20.20 dB	No DCG	No DCG
Arakkonam - Katpadi	BB	68.20 Kms	G652D	23.10 dB	No DCG	No DCG
Katpadi - Jolarpet	BB	93.00 Kms	G652D	30.20 dB	No DCG	No DCG
Jolarpet - Kuppam	BB	47.50 Kms	G652D	21.80 dB	No DCG	No DCG
Kuppam - Bangarpet	BB	39.70 Kms	G652D	21.50 dB	No DCG	No DCG

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Segment (Forward Direction)	Segment Type	Fiber Length	Fiber Type	Fiber Loss	Dispersion Tx	Dispersion Rx
Bangarpet - Whitefield	BB	52.80 Kms	G652D	26.10 dB	No DCG	No DCG
Whitefield - Bangalore	BB	27.40 Kms	G652D	28.00 dB	No DCG	No DCG
Bangalore - Yelhanka	BB	59.00 Kms	G652D	31.40 dB	No DCG	No DCG
Yelhanka - Dodballapur	BB	54.00 Kms	G652D	26.20 dB	No DCG	No DCG
Dodballapur - Hindupur	BB	54.00 Kms	G652D	31.80 dB	No DCG	No DCG
Hindupur - Penukonda	BB	22.00 Kms	G652D	17.90 dB	No DCG	No DCG
Penukonda - Dharmavaram	BB	55.40 Kms	G652D	18.60 dB	No DCG	No DCG
Dharmavaram - Anantapur	BB	54.00 Kms	G652D	17.90 dB	No DCG	No DCG
Anantapur - Gooty	BB	75.00 Kms	G652D	34.00 dB	No DCG	No DCG
Gooty - Guntakal	BB	31.00 Kms	G652D	16.20 dB	No DCG	No DCG
Guntakal - Adoni	BB	59.00 Kms	G652D	24.70 dB	No DCG	No DCG
Adoni - Raichur	BB	69.00 Kms	G652D	28.10 dB	No DCG	No DCG
Raichur - Yadgir	BB	69.00 Kms	G652D	27.60 dB	No DCG	No DCG
Yadgir - Wadi	BB	39.00 Kms	G652D	23.80 dB	No DCG	No DCG
Wadi - Tandur	BB	70.00 Kms	G652D	24.80 dB	No DCG	No DCG
Tandur - Vikarabad	BB	48.00 Kms	G652D	20.30 dB	No DCG	No DCG
Vikarabad - Secundrabad	BB	83.00 Kms	G652D	31.00 dB	No DCG	No DCG
Secundrabad - Bhongir	BB	56.00 Kms	G652D	21.90 dB	No DCG	No DCG
Bhongir - Jangaon	BB	36.00 Kms	G652D	21.00 dB	No DCG	No DCG
Jangaon - Kazipet	BB	53.00 Kms	G652D	21.00 dB	No DCG	No DCG
Kazipet - Jamikunta	BB	38.30 Kms	G652D	16.70 dB	No DCG	No DCG
Jamikunta - Ramagundam	BB	57.00 Kms	G652D	20.10 dB	No DCG	No DCG
Ramagundam - Sirpurkagaznagar	BB	72.00 Kms	G652D	22.00 dB	No DCG	No DCG
Sirpurkagaznagar - Ballharsha	BB	70.00 Kms	G652D	19.50 dB	No DCG	No DCG
Ballharsha - Warora	BB	64.00 Kms	G652D	27.80 dB	No DCG	No DCG
Warora - Wardha	BB	77.50 Kms	G652D	32.30 dB	No DCG	No DCG
Wardha - Nagpur	BB	85.00 Kms	G652D	29.70 dB	No DCG	No DCG
Nagpur - Chacher	BB	36.00 Kms	G652D	24.50 dB	No DCG	No DCG
Chacher - Tumsar Road	BB	64.00 Kms	G652D	25.00 dB	No DCG	DCG-100
Tumsar Road - Gondia	BB	50.00 Kms	G652D	26.30 dB	DCG-100	DCG-100
Gondia - Salkesa	BB	64.00 Kms	G652D	21.90 dB	No DCG	No DCG
Salkesa - Rajnandgaon	BB	45.00 Kms	G652D	38.00 dB	No DCG	DCG-100
Rajnandgaon - Durg	BB	55.00 Kms	G652D	19.70 dB	DCG-100	No DCG
Durg - Raipur	BB	74.00 Kms	G652D	20.40 dB	No DCG	DCG-100
Raipur - Hathband	BB	72.00 Kms	G652D	26.50 dB	No DCG	DCG-50
Hathband - Bilaspur	BB	82.00 Kms	G652D	29.00 dB	DCG-50	DCG-100
Bilaspur - Champa	BB	52.00 Kms	G652D	23.80 dB	No DCG	No DCG
Champa - Raigarh	BB	80.00 Kms	G652D	37.50 dB	No DCG	DCG-100
Raigarh - Jharsiguda	BB	81.00 Kms	G652D	26.00 dB	DCG-100	DCG-100
Jharsiguda - Sagra	BB	63.00 Kms	G652D	25.80 dB	No DCG	No DCG

Tenderer Sign with Seal

Segment (Forward Direction)	Segment Type	Fiber Length	Fiber Type	Fiber Loss	Dispersion Tx	Dispersion Rx
Sagra - Rourkela	BB	47.00 Kms	G652D	19.80 dB	No DCG	DCG-100
Rourkela - Manoharpur	BB	44.10 Kms	G652D	20.60 dB	No DCG	No DCG
Manoharpur - Chakradharpur	BB	67.00 Kms	G652D	25.50 dB	No DCG	DCG-100
Chakradharpur - Tata Nagar	BB	68.00 Kms	G652D	31.80 dB	DCG-100	No DCG
Tata Nagar - Dalbumgarh	BB	52.50 Kms	G652D	24.00 dB	No DCG	DCG-100
Dalbumgarh - Kharagpur Jn.	BB	92.00 Kms	G652D	30.10 dB	DCG-100	DCG-100
Kharagpur - Bishnupur	BB	93.50 Kms	G652D	31.30 dB	No DCG	DCG-100
Bishnupur - Adra	BB	89.00 Kms	G652D	26.30 dB	DCG-100	DCG-40
Adra - Asansol	BB	55.50 Kms	G652D	14.90 dB	DCG-40	DCG-100
Asansol - Durgapur	BB	49.50 Kms	G652D	28.00 dB	No DCG	No DCG
Durgapur - Khana	BB	54.50 Kms	G652D	19.10 dB	No DCG	DCG-100
Khana - Jaugram	BB	47.50 Kms	G652D	16.40 dB	DCG-100	No DCG
Jaugram - Kolkatta	BB	71.00 Kms	G652D	28.30 dB	No DCG	DCG-100
Raipur - Mahasamund	BB	56.50 Kms	G652D	24.10 dB	No DCG	No DCG
Mahasamund - Nawapada Rd	BB	65.50 Kms	G652D	24.70 dB	No DCG	DCG-100
Nawapada Rd - Titilagarh	BB	96.00 Kms	G652D	44.80 dB	DCG-100	DCG-100
Titilagarh - Muniguda	BB	93.20 Kms	G652D	37.30 dB	No DCG	DCG-100
Muniguda - Rayagada	BB	60.00 Kms	G652D	23.80 dB	DCG-100	DCG-100
Rayagada - Bobbili	BB	77.00 Kms	G652D	39.40 dB	DCG-100	No DCG
Bobbili - Vijaynagram	BB	56.60 Kms	G652D	21.00 dB	No DCG	DCG-100
Chennai – TCL Chennai	Metro	06.00 Kms	G652D	10.00 dB	No DCG	No DCG
Chennai – TCL Chennai	Metro	43.00 Kms	G652D	21.0 dB	No DCG	No DCG
Kolkatta - Bidhan Nagar	Metro	30.00 Kms	G652D	15.00 dB	No DCG	No DCG
Kolkatta - Bidhan Nagar	Metro	15.00 Kms	G652D	7.00 dB	No DCG	No DCG
Bidhan Nagar – TCL Kolkata	Metro	2.00 Kms	G652D	5.00 dB	No DCG	No DCG
Bidhan Nagar – TCL Kolkata	Metro	2.00 Kms	G652D	5.00 dB	No DCG	No DCG

Reverse direction

Segment (Reverse Direction)	Segment Type	Fiber Length	Fiber Type	Fiber Loss	Dispersion Tx	Dispersion Rx
Gummidipoondi - Chennai PoP	BB	64.00 Kms	G652D	26.40 dB	No DCG	No DCG
Sullupeta - Gummidipoondi	BB	50.00 Kms	G652D	18.40 dB	No DCG	No DCG
Gudur - Sullupeta	BB	64.00 Kms	G652D	26.00 dB	No DCG	No DCG
Nellor - Gudur	BB	45.00 Kms	G652D	22.90 dB	No DCG	No DCG
Kavali - Nellore	BB	55.00 Kms	G652D	23.10 dB	No DCG	No DCG
Ongole - Kavali	BB	74.00 Kms	G652D	31.30 dB	No DCG	No DCG
Bapatla - Ongole	BB	72.00 Kms	G652D	32.60 dB	No DCG	No DCG
Vijaywada - Bapatla	BB	82.00 Kms	G652D	32.80 dB	No DCG	No DCG
Eluru -Vijayawada	BB	68.00 Kms	G652D	26.80 dB	DCG-100	No DCG
Tadepaligudem - Eluru	BB	56.50 Kms	G652D	20.70 dB	DCG-80	DCG-100

Tenderer Sign with Seal

Segment (Reverse Direction)	Segment Type	Fiber Length	Fiber Type	Fiber Loss	Dispersion Tx	Dispersion Rx
Rajahmundry - Tadepaligudem	BB	49.00 Kms	G652D	22.30 dB	DCG-100	DCG-80
Samalkot - Rajahmundry	BB	57.00 Kms	G652D	21.70 dB	DCF-40	DCG-100
Tuni - Samalkot	BB	60.00 Kms	G652D	23.80 dB	No DCG	DCF-40
Anakapalli - Tuni	BB	72.00 Kms	G652D	25.60 dB	DCG-100	No DCG
Vishakhapatnam - Anakapalli	BB	42.00 Kms	G652D	27.60 dB	No DCG	DCG-100
Vijaynagram -Vishakhapatnam	BB	74.00 Kms	G652D	34.80 dB	No DCG	DCG-100
Srikakulam Road - Vijaynagram	BB	76.00 Kms	G652D	37.30 dB	No DCG	DCG-100
Palasa - Srikakulam Road	BB	79.00 Kms	G652D	29.10 dB	DCG-100	No DCG
Behrampur - Palasa	BB	82.00 Kms	G652D	29.90 dB	No DCG	DCG-100
Balugaon - Behrampur	BB	84.20 Kms	G652D	27.10 dB	DCG-100	DCG-40
Khurda Rd. - Balugaon	BB	80.30 Kms	G652D	35.80 dB	DCG-100	DCG-100
Bhuvaneshwar - Khurda Rd.	BB	53.20 Kms	G652D	21.70 dB	No DCG	DCG-100
Cuttak - Bhuvaneshwar	BB	31.30 Kms	G652D	17.00 dB	No DCG	DCG-100
Jajpur - Cuttak	BB	79.20 Kms	G652D	34.10 dB	No DCG	No DCG
Bhadrak - Jajpur	BB	49.20 Kms	G652D	25.20 dB	DCG-100	No DCG
Balasore - Bhadrak	BB	67.20 Kms	G652D	27.90 dB	DCG-100	DCG-100
Jaleshwar - Balasore	BB	52.80 Kms	G652D	24.90 dB	DCG-80	DCG-100
Kharagpur Jn. - Jaleshwar	BB	73.40 Kms	G652D	32.30 dB	No DCG	DCG-80
Panskura - Kharagpur Jn.	BB	48.00 Kms	G652D	22.20 dB	No DCG	DCG-100
Bagnan - Panskura	BB	38.00 Kms	G652D	23.80 dB	No DCG	No DCG
Kolkatta - Bagnan	BB	56.50 Kms	G652D	25.00 dB	No DCG	No DCG
Thiruvallur - Chennai PoP	BB	53.60 Kms	G652D	15.54 dB	No DCG	No DCG
Arakkonam - Thiruvallur	BB	30.00 Kms	G652D	17.30 dB	No DCG	No DCG
Katpadi - Arakkonam	BB	68.20 Kms	G652D	26.70 dB	No DCG	No DCG
Jolarpet - Katpadi	BB	93.00 Kms	G652D	33.00 dB	No DCG	No DCG
Kuppam - Jolarpet	BB	47.50 Kms	G652D	18.90 dB	No DCG	No DCG
Bangarpet - Kuppam	BB	39.70 Kms	G652D	24.80 dB	No DCG	No DCG
Whitefield - Bangarpet	BB	52.80 Kms	G652D	22.90 dB	No DCG	No DCG
Bangalore - Whitefield	BB	27.40 Kms	G652D	18.40 dB	No DCG	No DCG
Yelhanka - Bangalore	BB	59.00 Kms	G652D	24.80 dB	No DCG	No DCG
Dodballapur - Yelhanka	BB	54.00 Kms	G652D	18.30 dB	No DCG	No DCG
Hindupur - Dodballapur	BB	54.00 Kms	G652D	26.60 dB	No DCG	No DCG
Penukonda - Hindupur	BB	22.00 Kms	G652D	19.40 dB	No DCG	No DCG
Dharmavaram - Penukonda	BB	55.40 Kms	G652D	23.60 dB	No DCG	No DCG
Anantapur - Dharmavaram	BB	54.00 Kms	G652D	19.90 dB	No DCG	No DCG
Gooty - Anantapur	BB	75.00 Kms	G652D	38.70 dB	No DCG	No DCG
Guntakal - Gooty	BB	31.00 Kms	G652D	14.60 dB	No DCG	No DCG
Adoni - Guntakal	BB	59.00 Kms	G652D	23.60 dB	No DCG	No DCG
Raichur - Adoni	BB	69.00 Kms	G652D	29.10 dB	No DCG	No DCG
Yadgir - Raichur	BB	69.00 Kms	G652D	24.80 dB	No DCG	No DCG
Wadi - Yadgir	BB	39.00 Kms	G652D	22.90 dB	No DCG	No DCG

Tenderer Sign with Seal

Segment (Reverse Direction)	Segment Type	Fiber Length	Fiber Type	Fiber Loss	Dispersion Tx	Dispersion Rx
Tandur - Wadi	BB	70.00 Kms	G652D	22.60 dB	No DCG	No DCG
Vikarabad - Tandur	BB	48.00 Kms	G652D	21.90 dB	No DCG	No DCG
Secundrabad - Vikarabad	BB	83.00 Kms	G652D	32.50 dB	No DCG	No DCG
Bhongir - Secundrabad	BB	56.00 Kms	G652D	19.60 dB	No DCG	No DCG
Jangaon - Bhongir	BB	36.00 Kms	G652D	22.30 dB	No DCG	No DCG
Kazipet - Jangaon	BB	53.00 Kms	G652D	24.40 dB	No DCG	No DCG
Jamikunta - Kazipet	BB	38.30 Kms	G652D	18.20 dB	No DCG	No DCG
Ramagundam- Jamikunta	BB	57.00 Kms	G652D	21.40 dB	No DCG	No DCG
Sirpurkagaznagar - Ramagundam	BB	72.00 Kms	G652D	22.50 dB	No DCG	No DCG
Ballharsha - Sirpurkagaznagar	BB	70.00 Kms	G652D	20.20 dB	No DCG	No DCG
Warora - Ballharsha	BB	64.00 Kms	G652D	25.80 dB	No DCG	No DCG
Wardha - Warora	BB	77.50 Kms	G652D	27.00 dB	No DCG	No DCG
Nagpur - Wardha	BB	85.00 Kms	G652D	31.50 dB	No DCG	No DCG
Chacher - Nagpur	BB	36.00 Kms	G652D	21.10 dB	No DCG	DCG-100
Tumsar Road - Chacher	BB	64.00 Kms	G652D	20.70 dB	DCG-100	No DCG
Gondia - Tumsar Road	BB	50.00 Kms	G652D	24.10 dB	No DCG	DCG-100
Salkesa - Gondia	BB	64.00 Kms	G652D	22.30 dB	No DCG	DCG-100
Rajnandgaon - Salkesa	BB	45.00 Kms	G652D	30.80 dB	DCG-100	No DCG
Durg - Rajnandgaon	BB	55.00 Kms	G652D	25.80 dB	No DCG	DCG-100
Raipur - Durg	BB	74.00 Kms	G652D	20.70 dB	No DCG	No DCG
Hathband - Raipur	BB	72.00 Kms	G652D	23.30 dB	DCG-50	DCG-100
Bilaspur - Hathband	BB	82.00 Kms	G652D	27.60 dB	No DCG	DCG-50
Champa - Bilaspur	BB	52.00 Kms	G652D	26.40 dB	No DCG	DCG-100
Raigarh - Champa	BB	80.00 Kms	G652D	32.30 dB	DCG-100	No DCG
Jharsiguda - Raigarh	BB	81.00 Kms	G652D	27.50 dB	No DCG	DCG-100
Sagra - Jharsiguda	BB	63.00 Kms	G652D	20.80 dB	No DCG	DCG-100
Rourkela - Sagra	BB	47.00 Kms	G652D	19.50 dB	No DCG	No DCG
Manoharpur - Rourkela	BB	44.10 Kms	G652D	21.80 dB	No DCG	DCG-100
Chakradharpur - Manoharpur	BB	67.00 Kms	G652D	25.40 dB	DCG-100	No DCG
Tata Nagar - Chakradharpur	BB	68.00 Kms	G652D	27.30 dB	No DCG	DCG-100
Dalbumgarh - Tata Nagar	BB	52.50 Kms	G652D	23.90 dB	DCG-100	No DCG
Kharagpur - Dalbumgarh	BB	92.00 Kms	G652D	27.30 dB	No DCG	DCG-100
Bishnupur - Kharagpur	BB	93.50 Kms	G652D	34.70 dB	DCG-100	DCG-100
Adra - Bishnupur	BB	89.00 Kms	G652D	28.40 dB	DCG-40	DCG-100
Asansol - Adra	BB	55.50 Kms	G652D	21.10 dB	No DCG	DCG-40
Durgapur - Asansol	BB	49.50 Kms	G652D	25.20 dB	No DCG	No DCG
Khana - Durgapur	BB	54.50 Kms	G652D	22.20 dB	DCG-100	DCG-100
Jaugram - Khana	BB	47.50 Kms	G652D	19.60 dB	No DCG	DCG-100
Kolkatta - Jaugram	BB	71.00 Kms	G652D	30.10 dB	No DCG	No DCG
Mahasamund - Raipur	BB	56.50 Kms	G652D	24.40 dB	No DCG	DCG-100
Nawapada Rd - Mahasamund	BB	65.50 Kms	G652D	22.50 dB	DCG-100	No DCG

Tenderer Sign with Seal

Segment (Reverse Direction)	Segment Type	Fiber Length	Fiber Type	Fiber Loss	Dispersion Tx	Dispersion Rx
Titilagarh - Nawapada Rd	BB	96.00 Kms	G652D	42.20 dB	No DCG	DCG-100
Muniguda - Titilagarh	BB	93.20 Kms	G652D	33.90 dB	DCG-100	DCG-100
Rayagada - Muniguda	BB	60.00 Kms	G652D	22.70 dB	DCG-100	DCG-100
Bobbili - Rayagada	BB	77.00 Kms	G652D	25.20 dB	No DCG	DCG-100
Vijaynagram - Bobbili	BB	56.60 Kms	G652D	26.30 dB	No DCG	No DCG
TCL Chennai - Chennai	Metro	06.00 Kms	G652D	10.00 dB	No DCG	No DCG
TCL Chennai - Chennai	Metro	43.00 Kms	G652D	21.0 dB	No DCG	No DCG
Bidhan Nagar - Kolkatta	Metro	30.00 Kms	G652D	15.00 dB	No DCG	No DCG
Bidhan Nagar - Kolkatta	Metro	15.00 Kms	G652D	7.00 dB	No DCG	No DCG
TCL Kolkata - Bidhan Nagar	Metro	2.00 Kms	G652D	5.00 dB	No DCG	No DCG
TCL Kolkata - Bidhan Nagar	Metro	2.00 Kms	G652D	5.00 dB	No DCG	No DCG

Tenderer Sign with Seal

Annexure-Y

Optional ILA sites in New DWDM sections

S.No	Name of the Section	Location
01	Kharagpur – Dalbhumgarh	Jhargram
02	Behrampur – Palasa.	Jaduguria
03	Palasa - Srikakulam Rd.	Kotabommali
04	Muniguda – Titilagarh.	Langigarh
05	Titilagarh - Nawapada Rd.	Harishankar Nagar
06	Kharagpur- Bhishnupur	Chandrakona
07	Adra- Bishnupur.	Bankura
08	Champa- Raigarh.	Kharsia
09	Salakesa-Rajnandgaon	Dongargarh
10	Balugaon-Khurda Rd	Kalupada ghat
11	Jajpur-Cuttak	Dhanmandal

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Tenderer Sign with Seal