



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

ELECTRONIC TENDER DOCUMENT

FOR WORK OF

**“Design, Supply, Installation, Testing, Commissioning & AMC of DWDM & MDWDM
system for the OFC based communication network of RailTel”**

OPEN TENDER (Two Packet System)

खुली E-निविदा न. RailTel/Tender/OT/CO/P/ 2020-21/DWDM & MDWDM/549
dated: 01.12.2020

OPEN E-TENDER NO. RailTel/Tender/OT/CO/P/2020-21/DWDM & MDWDM/549
dated:-01.12.2020

रेलटेल
RAILTEL

खुली निविदा सूचना

E-Tender Notice No. RailTel/Tender/OT/CO/P/ 2020-21/DWDM & MDWDM/549
dated: 01.12.2020

रेलटेल कॉर्पोरेशन ऑफ इंडिया लि.(रेलटेल) “रेलटेल के ओएफसी आधारित संचार नेटवर्क के लिए डीडब्ल्यूडीएम और एमडीडब्ल्यूडीएम प्रणाली की डिजाइन, आपूर्ति, स्थापना, परीक्षण, कमीशन और एएमसी ” के लिये भारतीय पंजीकृत फर्मों से ई-टेंडर (दो पैकेट प्रणाली) आमंत्रित करता है।

क)	निविदा का डाउनलोडिंग के खुलने की तिथि	01.12.2020
ख)	प्री-बिड मीटिंग	15.12.2020 को 15.00 बजे.
ग)	बोली प्रस्तुत करने की अंतिम तिथि और समय	30.12.2020 को 15.00 बजे तक.
घ)	ई-बिड खुलने की तिथि	30.12.2020 को 15.30 बजे.
ङ)	निविदा की लागत (एएमसी को छोड़कर)	लगभग रु 39.91 करोड़
च)	बयाना राशि (ईएमडी) #	रु 21.5 लाख
छ)	निविदा दस्तावेज की फीस #	रु 5900/- (सभी समावेशी)

योग्य एमएसई को केवल निविदा दस्तावेज का मूल्य और ईएमडी से छूट दी गई है। कोई और छूट नहीं दी जाएगी।

नोट: निविदा सूचना और निविदा प्रलेख रेलटेल की वेबसाइट पर उपलब्ध हैं और www.railtelindia.com या ई-टेंडरिंग पोर्टल <https://www.railtel.enivida.com> से डाउनलोड किए जा सकते हैं। ऑनलाइन बोली जमा करने के लिए निविदाकर्ता को पोर्टल <https://www.railtel.enivida.com> से निविदा प्रलेख की आधिकारिक ऑनलाइन प्रति डाउनलोड करनी होगी। । सभी भविष्य की जानकारी अर्थात् इस निविदा के लिए शुद्धिपत्र / परिशिष्ट / संशोधन आदि निविदा केवल ई-टेंडरिंग पोर्टल पर पोस्ट की जाएगी। रेलटेल कार्यालय से निविदा प्रलेख की मुद्रित प्रति नहीं बेची जाएगी।

यह निविदा रेलटेल के इंटीग्रेटी पैकेट प्रोग्राम के तहत कवर की गई है और बोलीदाताओं को इंटीग्रेटी पैकेट पर हस्ताक्षर करने और बोली के साथ ही रेलटेल को जमा करने की आवश्यकता है।

बोलीदाता तैयारी, बोली की तैयारी/प्रस्तुति /भागीदारी से संबंधित सभी लागतों को वहन करेगा। रेलटेल किसी भी तरह से आचरण या परिणाम की उदासीनता से इन लागतों के लिए जिम्मेदार या उत्तरदायी नहीं होगा।

सुदेश कुमार
 01/12/2020

कार्यकारी निदेशक/परियोजना

OPEN TENDER NOTICE

E-Tender Notice No. RailTel/Tender/OT/CO/P/ 2020-21/DWDM & MDWDM/549
dated: 01.12.2020

RailTel Corporation of India Ltd. (RailTel) invites e-Tenders (Two Packet System) for “ **Design, Supply, Installation, Testing, Commissioning & AMC of DWDM and MDWDM system for the OFC based Communication Network of RailTel**” from Indian registered firms.

a)	Opening date of Tender downloading	01.12.2020
b)	Pre-Bid Meeting	15.12.2020 at 15:00 hrs.
c)	Last date & time of submission of bid	30.12.2020 upto 15:00 hrs.
d)	Opening of e-bid	30.12.2020 at 15:30 hrs.
e)	Estimated cost of work (excluding AMC)	Approx. Rs. 39.91 Cr.
f)	Earnest Money (EMD) #	Rs. 21.5 Lacs
g)	Fee of Tender Document #	Rs. 5900/- (all inclusive)

Eligible MSEs are exempted from cost of Tender Documents and EMD only. No other exemption will be given.

Note: Tender Notice and Tender Document are available on RailTel's website and can be downloaded from www.railtelindia.com or from the e-Tendering portal <https://railtel.enivida.com> For online bid submission the tenderer will have to necessarily download an official online copy of the tender document from portal <https://railtel.enivida.com>. All future information viz. corrigendum /addendum/ amendments etc. for this Tender shall be posted on this e-Tendering Portal only. Printed copy of Tender document will not be sold from RailTel office.

This tender is covered under Integrity Pact Programme of RailTel and the bidders are required to sign the Integrity Pact and submit the same to RailTel along with the bid.

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

21/12/2020
01/12/2020
Executive Director/Project

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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/Tender/OT/CO/P/2020-21/DWDM & MDWDM/549 date 01.12.2020

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 **120 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 **150 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. 21.5 Lacs/- (Rs. Twenty One Lacs Fifty Thousands Only)** through eNivida Portal herewith submitted 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:

CONTRACTOR (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 & MDWDM system as per technical requirements & specifications as defined in chapter- 3 of tender.	Lot	1				
A2	Spares @ 8% of supply against item A1 above.	Lot.	1				
A3	NMS						
(a)	Supply of NMS to support the specified numbers of NEs as per specifications in Chapter- 3 of tender (Software)	Lot	1				
(b)	Supply of NMS to support the specified numbers of NEs as per specifications in Chapter- 3 of tender (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 specifications in Chapter- 3 of tender	Nos.	8				
	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 DWDM & MDWDM 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 A3 of Schedule of Supplies.	Lot	1				

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	40				
B4	Cost per Engineer for level 2 support for two years during Warranty Period as per clause 2.4 of Chapter- 4A.	Nos	8				
B5	Incremental AMC charges (after warranty period) over and above 3.5% of overall cost (including taxes and duties) of Schedule of Supplies (A) as per clause 3.2 of Chapter-4A.	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	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 and B of this Chapter). The materials as per SOR are required to be delivered within the period as indicated in clause 4 of Chapter- 4A to the sites as decided by the respective Regional GM/EDs. b) Bidder shall provide Bill of material with unit rate as well as cost in SOR format separately for all the routes of DWDM & MDWDM mentioned in Technical requirement (Chapter- 3) along with the price bid and unpriced SOR & BOM with the technical bid. c) 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. B1. Materials not installed / not to be installed need to be shipped to location as decided by RGM/Executive Director of the Region. d) 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. B1 to B5. e) Tenderer may also quote unit price for the other cards/items in a separate sheet which are not required in this tender for offered equipment's and submit along with the price bid. This shall not be taken for evaluation purpose.
II	Tenderer to give the detailed Bill of Material including break up of cost of common units/cards/module/chassis/Transponder/Muxponder/Patch Cords/ROADM/Fan Tray unit etc. in the price bid for building up the SOR items A1 and A2 of Schedule of Supply (A).
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.
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 in Technical bid.													
V	The cost of 8% of each type of part-items included in item nos. A1 of the Schedule of Supply (A) should be quoted in SOR item no. A2 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 rate for AMC he will be paid at his quoted rate per annum and five years 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. A3 (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 provided at each region. Total no. of equipment = 2 servers (Main+ DR) + 2 clients at each region with the required software licenses.													
IX	In SOR item no. B4 (Cost per Engineer for level 2 support), tenderer has to quote unit cost of one Engineer during Warranty Period (i.e. for the period of two years after completion of Maintenance period of 1 year & issuing of Final Acceptance Certificate (FAC)) and total cost for 2 nos. of Engineers per Region for level 2 support (8 in total).													
X	Tenderer should submit the soft copy (Word/Excel/PDFs format) of offer. Unpriced 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 Unpriced copy of the same BOM should be submitted with the technical/credential Bid for evaluation. The Bid without the BOM is liable to be rejected. The Format of “Bill of Material for Schedule of Requirement” is as below:													
					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										
	1	(to be provided by bidder)												
	2	(to be provided by bidder)												
XII	OEM/Bidders should design DWDM & MDWDM network on planning tool in line with tender requirement (Fiber loss & margin etc.) and should be submitted to RailTel.													

Annexure-A**Price Schedule for Supply Items**

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

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Annexure-B**Price Schedule for Service Items**

SN	Description	Total Qty	Basic Unit Price exclusive of all levies and charges (in Rs.)	Other Charges and Levies, if any (to be specified by bidder)	CGST, SGST & GST		Unit price (all inclusive) (4+5+7)
				Amt (in Rs.)	%	Amt (in Rs.)	Amt (in Rs.)
1	2	3	4	5	6	7	8

(End of Chapter- 2)

CHAPTER-3A**TECHNICAL REQUIREMENTS AND SPECIFICATIONS FOR DWDM SYSTEM****1.1 Introduction (DWDM)**

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.

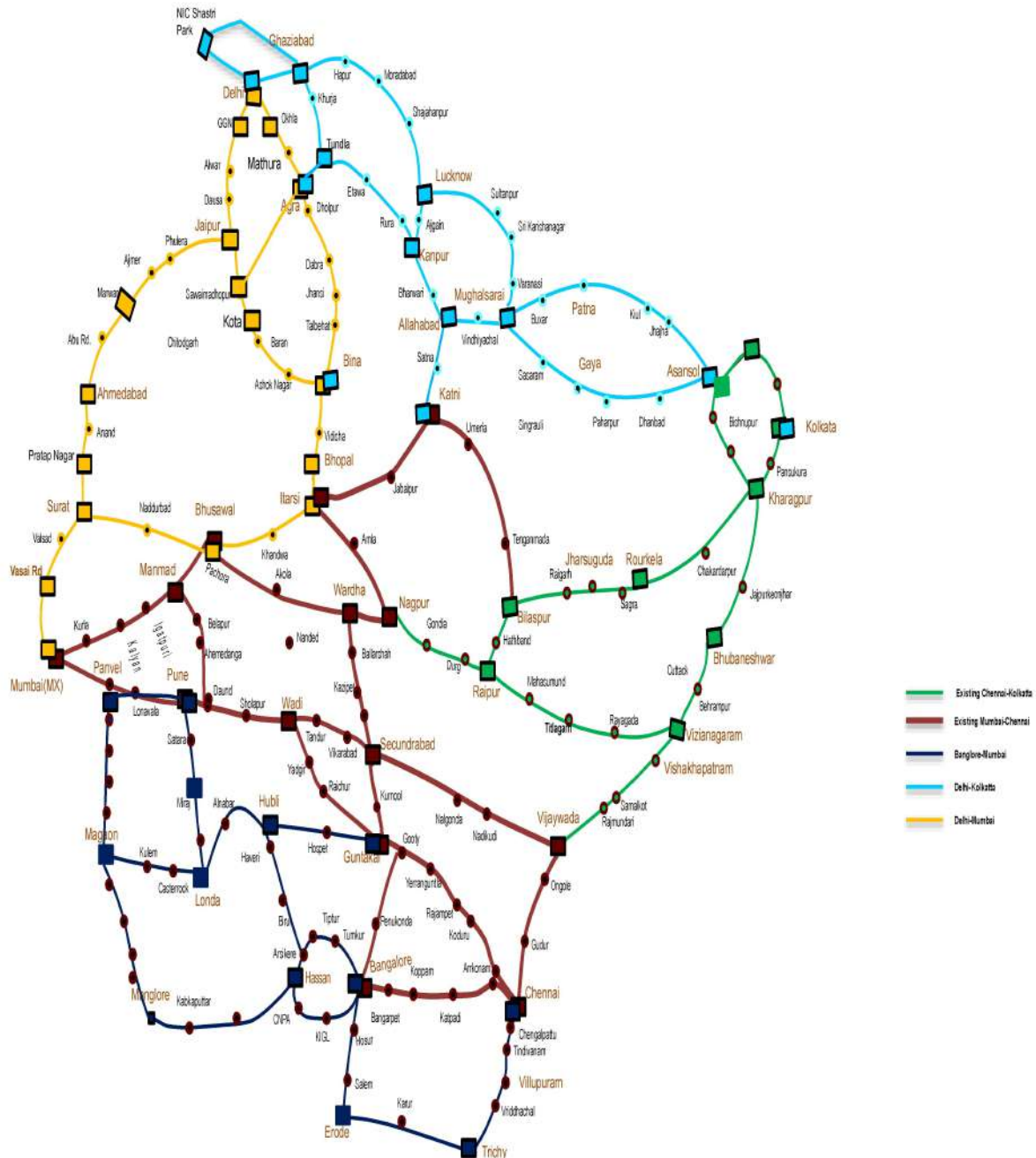
At present RailTel has deployed 40/80 Channel (100/50GHz) DWDM network with 100G/200G line system between Mumbai to Chennai and covering other Important Cities like, Hyderabad, Bengaluru, Vijayawada, Bhusaval, Pune, Wardha, Nagpur, Wadi etc. The Network is created using ADVA make DWDM FSP3000 series. Vijayawada to Kolkata & Nagpur to Kolkata network routes are created using Ciena make 6500 DWDM. Details of ADVA & Ciena make DWDM are enclosed at Annexure-III of this chapter.

RailTel desires to create 100G/200G network by using mix of Alien wavelength over ADVA's & Ciena make coherent DWDM segment & new DWDM system using new fiber pairs on remaining segment. Details of routes are as follows: -

1. Delhi to Kolkata
2. Delhi to Mumbai
3. Bangalore to Mumbai & Bangalore to Chennai
4. Chennai to Mumbai.

Network diagram is given below:





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/200G 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 FOR DWDM

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 .The scope also includes installation, testing, Commissioning & Acceptance of the DWDM Network including integration with the existing system. 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 routes with traffic matrix of DWDM network

S.N.	Links	Type	Capacity(Client Side)	Route
1	Delhi – Mughalsarai	Protected with figure of 8 at Kanpur	2x100G	Path-1 -New Delhi-Ghaziabad-Aligarh-Kanpur-Allahabad-Mughalsarai. Path-2 New Delhi-NIC(SP)-Ghaziabad-Moradabad-Lucknow-Kanpur-Lucknow- Mughalsarai.
2	Mughalsarai—Kolkata	Protected with figure of 8 at Asansol	2x100G	Path-1 – Mughalsarai-Patna-Asansol-Kolkata. Asansol-Kolkata on Alien wavelength. Path-2 Mughalsarai-Gaya-Asansol-Kharagpur-Kolkata. Asansol-Kharagpur-Kolkata on. Alien wavelength.
3	Delhi to Bina	Protected	2x100G	Path-1 -New Delhi-Agra-Bina. Path-2 New Delhi-Jaipur- Sawai madhopur-Bina.
4	Bina to Itarsi	Linear	2X100G	Bina-Bhopal-Itarsi
5	Itarsi to Bhusaval	Linear	2X100G	Itarsi to Bhusaval
6	Mumbai to Bhusaval	Protected	1x100G	Path-1 -Mumbai -Manmad-Bhusaval (Alien wavelength).

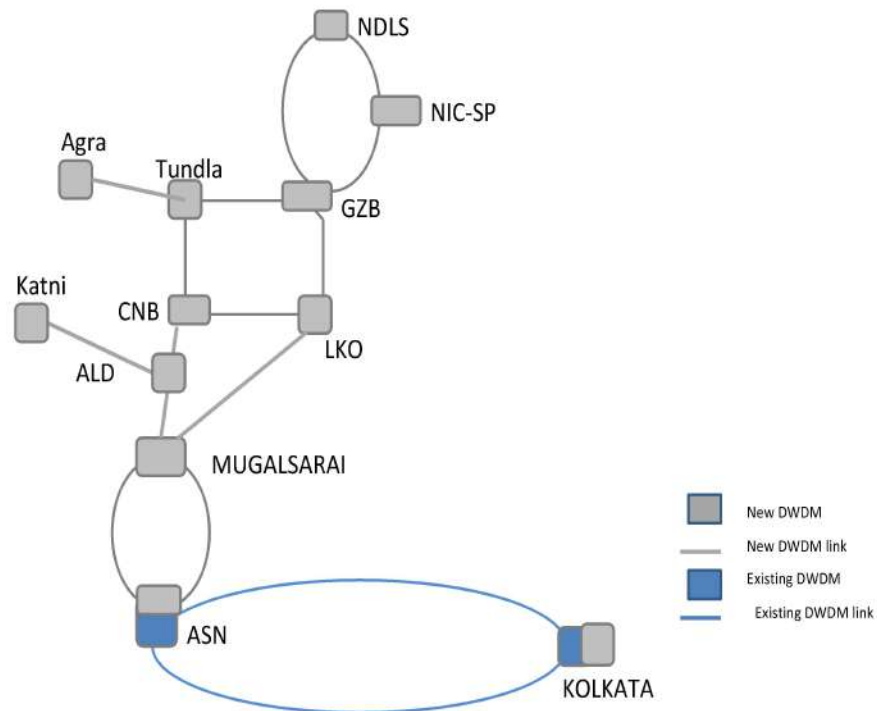
				Path-2 Mumbai-Surat-Bhusaval.
7	Delhi—Pratap Nagar	Linear	1X100G	New Delhi-Jaipur- Marwar-Pratap Nagar.
8	Pratap Nagar to Mumbai	Linear	2X100G	Pratap Nagar -Surat-Mumbai
9	Secunderabad (SC) to Manmad (Protected)	Protected	1X100G	Path-1 :Manmad-Bhusaval-Wardha-Secunderabad (Alien wavelength) Path-2 : Manmad-Belapur-Daund-Pune-Daund-Sholapur-Wadi-Secunderabad (Alien wavelength).
10	Mumbai (Mx) to Manmad	Protected	1x100G	Path-1 -Mumbai -Manmad (Alien wavelength) Path-2 Mumbai-Pune- Manmad (Alien wavelength).
11	Bhusaval – Nagpur	Linear	1X100G	Bhusaval Wardha-Nagpur (Alien wavelength) .
12	Vijayawada-Chennai	Linear	1X100G	Vijayawada-Chennai (Alien wavelength).
13	Vijayawada-Secunderabad	Linear	1X100G	Vijayawada-Secunderabad (Alien wavelength).
14	Chennai – Secunderabad	Protected	1X100G	Path-1 -Chennai -Guntakal-Secunderabad (Alien wavelength). Path-2 Chennai - Vijayawada - Secunderabad (Alien wavelength).
15	Secunderabad – Nagpur	Linear	1X100G	Secunderabad-Nagpur (Alien wavelength).
16	Chennai-Bangalore	Protected	1X100G	Path-1 -Chennai -Bangalore (Alien wavelength). Path-2 Chennai - Erode.
17	Bangalore-Hassan	Protected	1X100G	Path-1 Bangalore- Arsikere -Hassan Path-2 Bangalore- KIGL -Hassan
18	Hassan- Madgaon (Goa)	Protected	1X100G	Path-1 Hassan-Manglore-Madgaon (Goa). Path-2 Hassan- Arsikere -Hubli-Londa- Madgaon (Goa).
19	Madgaon (Goa)-Panvel	Protected	1X100G	Path1 :-Madgaon (Goa)--Panvel Path-2 : Panvel-Pune-Londa-Goa.
20	Bangalore-Guntakal	Protected	1X100G	Path1 : Bangalore- Arsikere-Hubli-Guntakal. Path2 : Bangalore Penukonda -Guntakal (Alien wavelength).
21	Pune-Mumbai	Protected	1X100G	Path-1 : Mumbai -Panvel -Pune (Alien wavelength) Path-2 : Mumbai-Manmad-Pune(Alien wavelength).
22	Guntakal – Secunderabad	Protected	1X100G	Path-1 Guntakal-Secunderabad (Alien wavelength). Path-2 Guntakal-Wadi-Secunderabad (Alien wavelength).
23	Jaipur-Marwar	Linear	10X10G	Jaipur-Marwar

24	Marwar-Pratap Nagar	Linear	10X10G	Marwar-Pratap Nagar
25	Jaipur-Kota	Linear	10X10G	Jaipur-Kota
26	KOTA-BENA	Linear	10X10G	Kota -Bina
27	New Delhi –NIC Shastri Park	Protected	10X10G	New Delhi –NIC Shastri Park
28	New Delhi – Ghaziabad	Protected	10X10G	New Delhi –Ghaziabad
29	Kota –AGRA	Protected	10X10G	Path-1 Kota -Sawai Madhopur- Agra. Path-2 Kota-Bina-Agra.

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

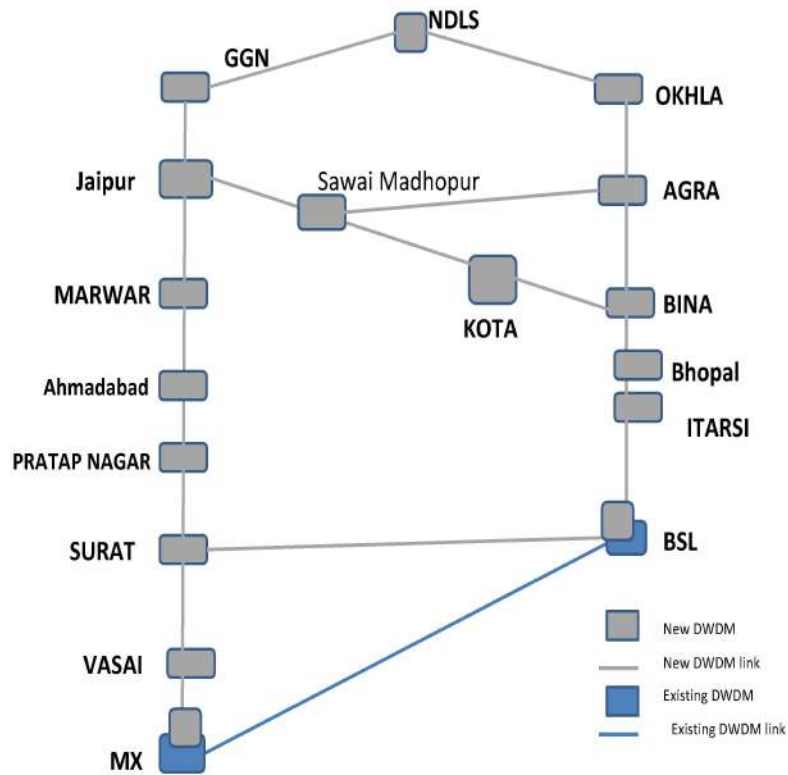
1. **Delhi to Kolkata**

DELHI-KOLKATA



Note: - Link between Asansol (ASN) to Kolkata in blue colour should be on Alien wavelength using existing network of Ciena make coherent DWDM optical layer segment.

2. Delhi to Mumbai

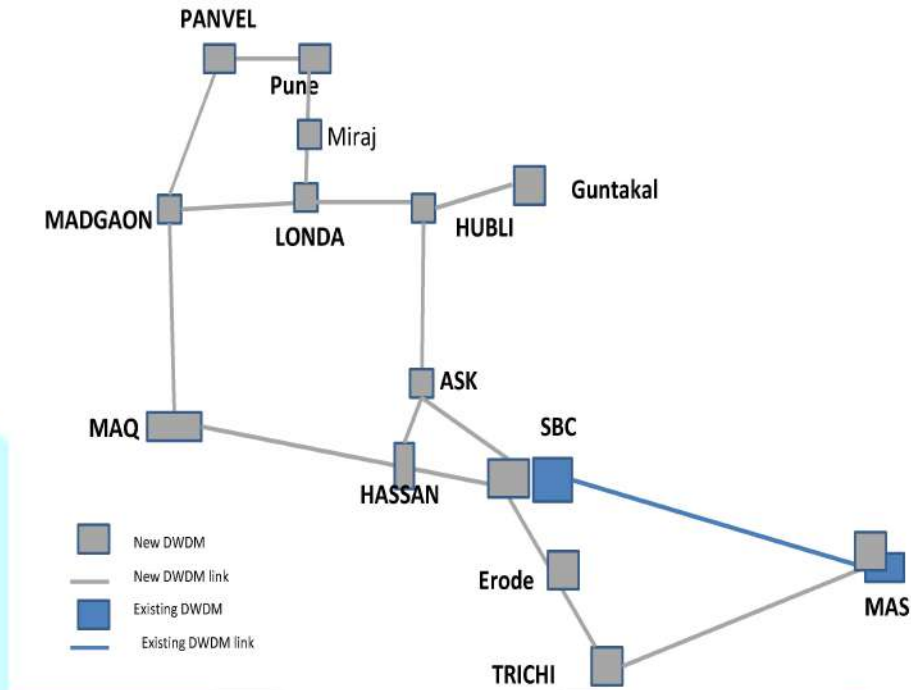
DELHI-MUMBAI (DWDM)

Note: - Link between Mumbai (Mx) to Bhusaval (BSL) in blue colour should on Alien wavelength using existing network of Adva make coherent DWDM optical layer segment.

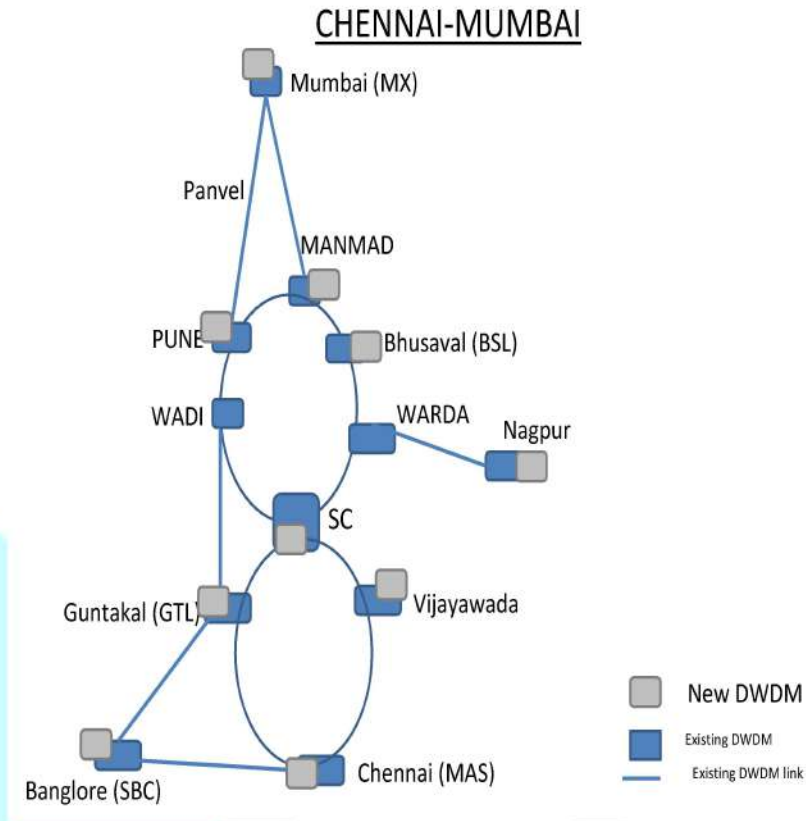
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3. Bangalore to Mumbai and Chennai to Bangalore

Mumbai-Bangalore & Chennai -Bangalore



Note: - Link between Bangalore (SBC) to Chennai (MAS) in blue colour should be on Alien wavelength using existing network of Adva make coherent DWDM optical layer segment.

4. **Chennai to Mumbai**

Note: - Link should be on Alien wavelength using existing Network of Adva make coherent DWDM optical layer segment.

5. Following photonic component are deployed in RailTel network and shall be considered for design.

5.1 **Mumbai –Chennai (Existing 100G Coherent technology based).**

- OADM & ILA-OADM sites are equipped with ROADM 8x1 & 4x1 for 100G Coherent Photonics with 50 GHz channel spacing.
- OADM sites equipped with 80 Channel Mux/Demux with 50 GHz channel spacing.
- ILA sites equipped with Mid Stage Amplifier with East Direction and West direction.
- nx100G DCM free network.
- Existing network is running 100G channel based on DP-QSPK modulation
- Existing working channel matrix is as below.

S.No	Segment	Optical Line System	No of 10G Channels	No of 100G Channels
1	Secunderabad - Vijayawada	80	-	11
2	Vijayawada - Chennai	80	-	12
3	Chennai - Bangalore	80	-	11
4	Bangalore - Guntakal	80	-	8
5	Guntakal - Secunderabad	80	-	7
6	Guntakal - Wadi	80	-	9

7	Wadi - Secunderabad	80	-	14
8	Wadi - Pune	80	-	9
9	Pune - Mumbai	80	-	6
10	Pune - Manmad	40	-	2
11	Mumbai - Manmad	80	-	6
12	Manmad - Bhusawal	40	-	8
13	Bhusawal - Wardha	80	-	8
14	Wardha - Nagpur	80	-	5
15	Wardha - Secunderabad	80	-	10
16	Nagpur - Katni	80	-	1
17	Katni - Bilaspur	80	-	1

g) Existing Node details

S. No	Node Name	Node Type
1	Secunderabad	OADM
2	Nagireddipalli	ILA
3	Nalgonda	ILA
4	Miryalaguda	ILA
5	Nadikudi	ILA
6	Sattenapalli	ILA
7	Guntur	ILA
8	Vijaywada	OADM
9	Tenali	ILA
10	Bapatla	ILA
11	Ongole	ILA
12	Kavali	ILA
13	Nellore	ILA OADM
14	Gudur	ILA
15	Sullurpet	ILA
16	Gumdipendi	ILA
17	Chennai	OADM
18	Tiruvallur	ILA
19	Arrakonam I	ILA
20	Renigunta	ILA
21	Kodur	ILA
22	Rajampet	ILA OADM
23	Cuddapha	ILA
24	Yerraguntla	ILA
25	Tadipatri	ILA
26	Gooty I	ILA
27	Guntakal	OADM
28	Adoni	ILA
29	Raichur	ILA
30	Yadgir	ILA
31	Wadi	OADM
32	Tandur	ILA
33	Vikarabad	ILA
34	Shadnagar	ILA
35	Mahbubnagar	ILA
36	Wanaparthy Rd	ILA

37	Gadwal	ILA
38	Kunrool Town	ILA
39	Dhone	ILA
40	Gooty	ILA
41	Anatapur	ILA
42	Dharmavarm	ILA
43	Penukonda	ILA
44	Hindupur	ILA
45	Dodbalapur	ILA
46	Yelhanka	ILA
47	Bangalore	OADM
48	White field	ILA
49	Bangarpet	ILA
50	Kuppam	ILA
51	Jolarpet	ILA
52	Katpati	ILA
53	Arrakonam -2	ILA
54	Thiruvallur	ILA
55	Bongir	ILA
56	Jangaon	ILA
57	Kazipet	ILA
58	Jammikunta	ILA OADM
59	Ramagundam	ILA
60	Sirpur Kagaznagar	ILA
61	Ballashash	ILA
62	Warora	ILA
63	Wardha	OADM
64	Dhamangaon	ILA
65	Akola	ILA
66	Badnera	ILA
67	Shegaon	ILA
68	Malkapur	ILA
69	Bhusawal	ILA OADM
70	Jalgaon	ILA
71	Pachora	ILA
72	Chalisgaon	ILA
73	Nandgaon	ILA
74	Manamad	ILA OADM
75	Nasik	ILA
76	Igatpuri	ILA
77	Asangaon	ILA
78	Kalyan	ILA
79	Kurla	ILA
80	Mahalakshmi	ILA
81	Panvel	ILA
82	Lonavala	ILA
83	Pune	ILA
84	Yawat	ILA
85	Daund	ILA
86	Bhigwan	ILA
87	Kurudwadi	ILA

88	Sholapur	ILA OADM
89	Dhudhani	ILA
90	Gulberga	ILA
91	Nagpur	OADM
92	Katol	ILA
93	Padurna	ILA
94	Amla	ILA
95	Ghorodongri	ILA
96	Itarsi	OADM
97	Pipariya	ILA
98	Gadarwada	ILA
99	Shridham	ILA
100	Jabalpur	ILA
101	Sihora road	ILA
102	Katni	OADM
103	Umaria	ILA
104	Shahdol	ILA
105	Annupur	ILA
106	Pendra	ILA
107	Belghana	ILA
108	BIlaspur	ILA
109	Kopargaon	ILA
110	Belapur	ILA
111	Ahmednagar	ILA
112	Visapur	ILA

i) Following are characters of existing Amplifiers.

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

5.2 Vijayawada –Kolkata & Nagpur- Kolkata (Existing 100G/200G/300G Coherent technology based).

- a) OADM & ILA-OADM sites are equipped with ROADM 8x1 Coherent Photonics with flexi grid C- band ROADM.
- b) OADM sites equipped with 40 Channel Mux/Demux (minimum) with 100 GHz channel spacing.
- c) ILA sites equipped with Mid Stage Amplifier with East Direction and West direction.
- d) n x100G DCM free network.
- e) Existing network is running 100G/200G/300G channel based on 16 QAM / 4D - 32 QAM modulation.
- f) Existing working channel matrix is as below.

Sr. No.	Segment Details	Optical Line System	No. of 10G Channels	No. of 100G Channels
1	Nagpur - Kolkata PoP	40 Ch.	0	1 CH. of 200G

2	Vijaywada to Kolkata PoP	40 Ch.	0	1 CH. of 300G
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g) Existing Node details

Sr. no.	Node Name	Node Type
1	Bhuvaneshwar	ROADM
2	Cuttak	ILA
3	New ILA Dhanmandal	ILA
4	Jajpur	ILA
5	Bhadrak	ILA
6	Balasore	ILA
7	Jaleshwar	ILA
8	New ILA Datan	ILA
9	Kharagpur Jn	ROADM
10	Jharsiguda	ILA
11	Sagra	ILA
12	Rourkela	ROADM
13	Manoharpur	ILA
14	Chakradharpur	ILA
15	New ILA SINI	ILA
16	Tata Nagar	ILA
17	Dalbungarh	ILA
18	Panskura	ILA
19	Bagnan	ILA
20	Kolkatta	ROADM
21	Nagpur	ROADM
22	Chacher	ILA
23	Tumsar Road	ILA
24	Gondia	ILA
25	Salkesa	ILA
26	New ILA Dongargarh	ILA
27	Rajnandgaon	ILA
28	Durg	ILA
29	Raipur	ROADM
30	Vijayawada	ROADM
31	Eluru	ILA
32	Tadepaligudem	ILA
33	Rajahmundry	ILA
34	Samalkot	ILA
35	Tuni	ILA
36	Anakapalli	ILA
37	Vishakhapatnam	ILA
38	New ILA Kottavalasa	ILA
39	Vijaynagar	ROADM
40	New ILA Chipurupalli	ILA
41	Srikakulam Road	ILA
42	New ILA Kotabommali	ILA
43	Palasa	ILA
44	New ILA Jaduguria	ILA
45	Behrampur	ILA
46	New ILA HUMA	ILA
47	Balugaon	ILA
48	New ILA Kalupada ghat	ILA

Sr. no.	Node Name	Node Type
49	Khurda Rd	ILA
50	New ILA Chandrakona	ILA
51	Bishnupur	ILA
52	Adra	ILA
53	Asansol	ROADM
54	Durgapur	ILA
55	Khana	ILA
56	Jaugram	ILA
57	New ILA kamarkundu	ILA
58	Mahasamund	ILA
59	Nawapada Rd	ILA
60	New ILA HarishankarN	ILA
61	Titilagarh	ROADM
62	New ILA Langigarh	ILA
63	Muniguda	ILA
64	Rayagada	ILA
65	New ILA Parvatipuram	ILA
66	Hathband	ILA
67	Bilaspur	ROADM
68	Champa	ILA
69	Jharadih	ILA
70	Raigarh	ILA
71	Bobbili	ILA
72	New ILA Jhargram	ILA
73	New ILA Nipania	ILA

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

1. Booster Amplifier:
 - i. Gain: (DFG) 23dB
 - ii. Output Power: 23 dBm
2. Pre-Amplifier
 - i. Gain: (DFG) 23dB
 - ii. Output Power: 23 dBm

5.3 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.

5.4 RailTel will provide a Rack Space and power supply (DC) for equipment Installation & Commissioning.

5.5 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.

5.6 The locations can be used as ILA & OADM locations. List of location and Segments for New DWDM is placed at **Annexure-II**.

5.7 Bidder/OEM can use same DWDM Network (Proposed system) components like chassis, OSC system and modules at common locations/paths for different DWDM routes without impacting traffic and functionality of DWDM Network of particular routes.

5.8 Bidder shall consider fiber losses with 1 dB additional fiber repair margin per span for Alien

Wavelength design & 6 dB fiber repair margin and max fiber loss can be considered upto 33 db per span in New DWDM backbone system (e.g. if current fiber losses is 30 db , fiber repair margin will be 3 db, this will not applicable for those spans where optional ILA sites are available in annexure-II) . In case of span fiber loss is equal or more than 33 db in that case 1 dB additional fiber repair margin per span shall be considered. Bidder can also considered max 4 more optional ILA sites apart from optional ILA sites are available in **Annexure-II**. Bidder is also required to submit full link budget calculation of required channels 40 along with input parameters Vs output of planning tool. Fiber Characteristic – Forward and reverse path for the existing and New DWDM ILA and OADM Locations are placed at **Annexure-I**.

1.2.2 Bidder should propose solution in New DWDM system with following minimum OADM sites with ROADM & Mux/Demux.

1. Delhi-Kolkata

- a. New Delhi
- b. NIC Shastri Park
- c. Ghaziabad
- d. Lucknow
- e. Tundla
- f. Kanpur
- g. Mughalsarai
- h. Allahabad
- i. Asansol
- j. Katni
- k. AGRA

2. Delhi-Mumbai

- a. Delhi
- b. Gurgaon
- c. Jaipur
- d. Marwar Jn
- e. Ahmadabad
- f. Pratap Nagar
- g. Surat
- h. Vasai
- i. Mumbai
- j. Bhusaval
- k. Itarsai
- l. Bhopal
- m. Bina
- n. Kota
- o. Sawai Madhopur
- p. Agra
- q. Okhla

3. Mumbai- Bangalore & Bangalore-Chennai.

- a. Panvel
- b. Madgaon
- c. Manglore
- d. Hasan
- e. Bangalore
- f. Arsikere

- g. Hubli
- h. Londa.
- i. Pune
- j. Miraj
- k. Guntakal
- l. Erode
- m. Chennai
- n. Trichy

1.3 Introduction of Metro DWDM (MDWDM)

RailTel is implementing optical fiber based broadband telecom Metro DWDM access 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.

RailTel desires to create 10 & 100G coexist network by using mix 10G wavelength and 100G coherent wavelength MDWDM system by using new fiber pairs. Details of routes are as follows:

1. Pratap Nagar- Nagda- Bhopal- Agra (Kota to Agra & Sawai Madhopur to Jaipur segment is covered in DWDM network)
2. Manmad- Secunderabad
3. Delhi Access (Noida to Ghaziabad).
4. Chandigarh- Shimla
5. Bangalore & Chennai Access

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 800 Gbps in Backbone line side. The system must be programmable and highly intelligent, with very basic, robust and simple architecture. Proposed solution shall work seamlessly with 100G and 10G channels.

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

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

1.3.1 DESIGN OF MDWDM NETWORK

- a. RailTel invites solution for following routes with traffic matrix on MDWDM network.

S.N	Links	Client-side Capacity	Link type	MDWDM Route
1	Chennai – Katapadi	10X10G (Protected)	Muxponder	Path-1: Chennai -Gudur- Renugunta- Katapadi Path-2: Chennai – Arakkonam – Katapadi
2	Jolarpettai to Bangalore	10X10G	Muxponder	Path-1: Jolarpettai-Bangarpet- YNK-YPR Bangalore (SBC).
3	Jolarpettai- Katapadi	4X10G	Coloured SFP on Router	Linear path
4	Karur- Dindigul	2X10G	Coloured SFP on Router	Linear path
5	Salem-Karur	2x10G	Coloured SFP on Router	Linear path

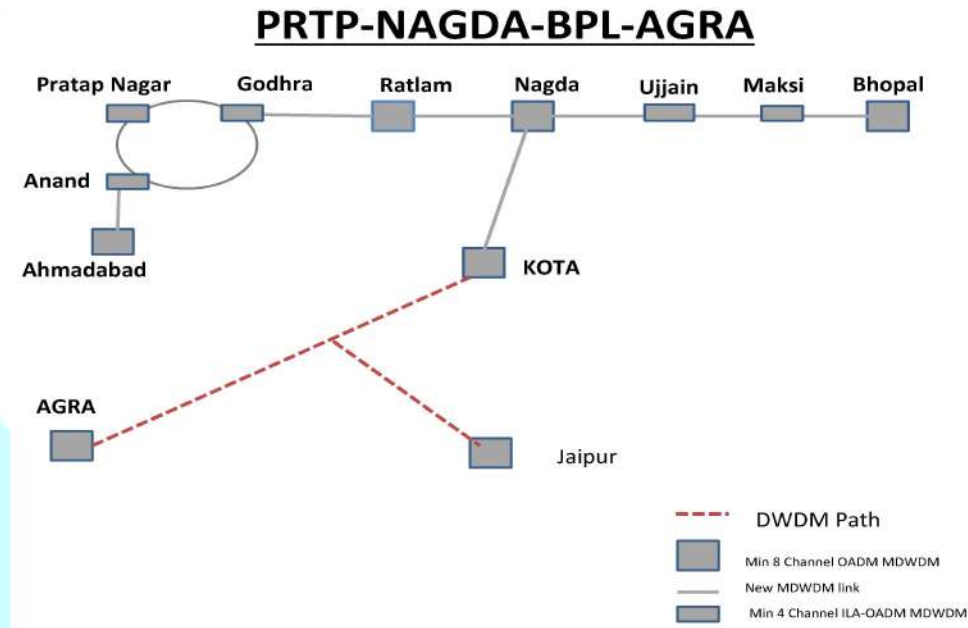
6	Jolarpettai-Salem	2X10G	Coloured SFP on Router	Linear path
7	Bangalore – NIC	10X10G (Protected)	Muxponder.	Path1: Bangalore – NIC (On Alien Wavelength over ADVA Network 20 db fiber loss and 10 km) Path2: Bangalore – Byappanahalli-White Field -NIC.
8	Arakkonam-Renugunta	2x10G	Coloured SFP on Router	Linear path
9	Arakkonam-Chengalpattu	2x10G	Coloured SFP on Router	Linear path
10	Arakkonam-Chennai	2x10G	Coloured SFP on Router	Linear path
11	Arakkonam-Katpadi	2x10G	Coloured SFP on Router	Linear path
12	Bangarpet-Jolarpettai	2X10G	Coloured SFP on Router	Linear path
13	Bangarpet-White Field	2X10G	Coloured SFP on Router	Linear path
14	Bangarpet-YNK	2X10G	Coloured SFP on Router	Linear path
15	Bangalore (SBC)-YNK	2X10G	Coloured SFP on Router	Linear path
16	Byappanahalli-White field	2X10G	Coloured SFP on Router	Linear path
17	White Field-SRIT	2X10G	Coloured SFP on Router	Linear path
18	SRIT-NIC	2X10G	Coloured SFP on Router	Linear path
19	White Field-YNK	2X10G	Coloured SFP on Router	Linear path
20	Bhopal to Nagda	10X10G	Muxponder	Linear path
21	Nagda to PRTP NAGAR	10X10G	Muxponder	Linear path
22	Nagda to Kota	10X10G	Muxponder	Linear path
23	Noida to GZB	1X10G	Coloured SFP on Router	Linear path
24	Anand Vihar to Barakhamba	1X10G	Coloured SFP on Router	Linear path
25	Noida to Mayor Vihar	1x10G	Coloured SFP on Router	Linear path
26	Mayor Vihar to Barakhamba	1x10G	Coloured SFP on Router	Linear path
27	Chandigarh-Shimla	10X10G	Muxponder	Linear path
28	Manmad to Nanded	10X10G	Muxponder	Linear path
29	Nanded to SC	10X10G	Muxponder	Linear path

- b. Router side SFP+ (DWDM coloured SFP) shall be supplied by Bidder as per technical specification given in clause 4.7 of Chapter 8A. Bidder can also propose 10G transponder instead of DWDM 10G SFP+ (Router side) as per specifications given in clause 1.3 of Chapter 8A of DWDM & MDWDM Technical Specifications. In that case, Transponder should have minimum line/client-side ports as

per traffic matrix requirement. Clients side should be equipped with 10G SFP+/XFP (1310nm).

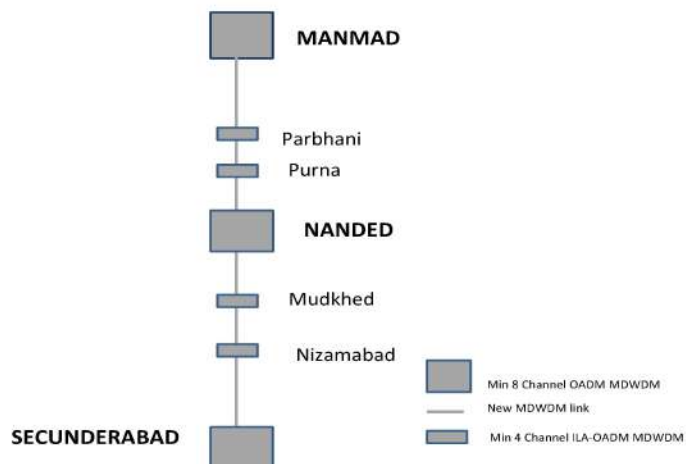
c. Following is the proposed network topology for MDWDM link engineering & solution design.

1. Pratap Nagar ---Nagda—Bhopal—Agra



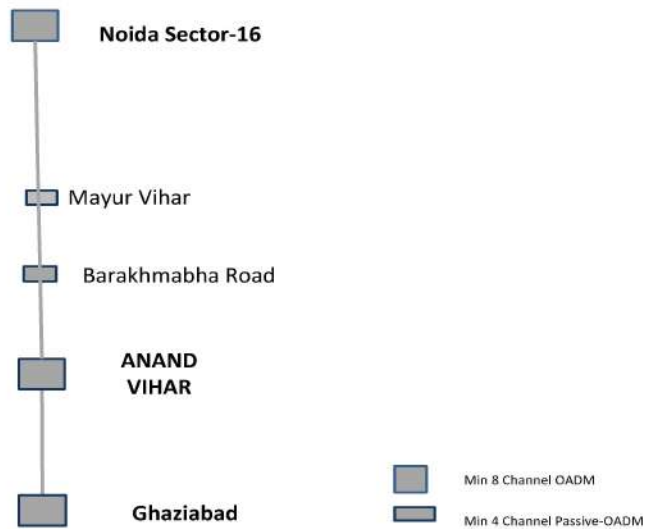
2. Manmad -Secunderabad

MANMAD-SC



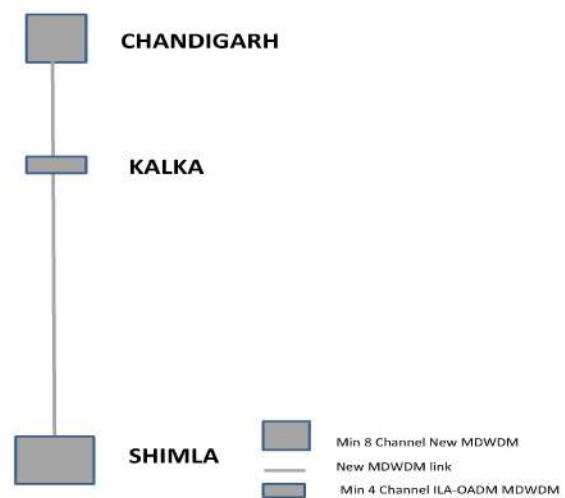
3. **Delhi Access (Noida to Ghaziabad).**

DELHI ACCESS



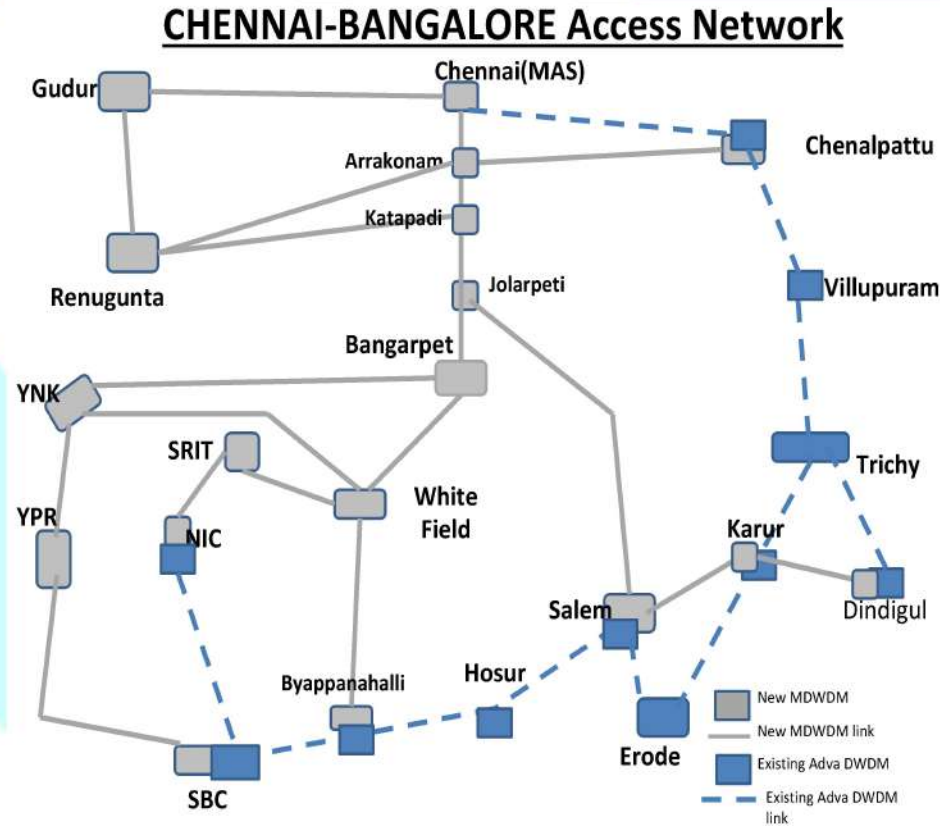
4. **Chandigarh –Shimla**

CHANDIGARH- SHIMLA



RAILTEL

5. Bangalore & Chennai Access



6. Following photonic shall be considered for design

- a) OADM sites equipped with Minimum 8 Channel Mux/Demux (with express port) with 100 GHz channel spacing.
 - b) Some of ILA-OADM Sites (as per Network Topology of MDWDM) should be equipped with Minimum 4 Channel Mux/Demux with express port with 100 GHz channel spacing. The proposed 4 Channel Mux/Demux (minimum) should have common channel frequencies with minimum 8 Channel Mux/Demux (Main OADM Node).
 - c) ILA sites equipped with Mid/Single/Dual Stage Amplifier for East Direction and West direction.
 - d) DCM should be use as minimum as possible to run 10G network as per traffic matrix requirement.
 - e) The proposed 100G transponder (10x10G) shall be coherent technology based & link performance shall meet BER at 1E-15.
7. Bidder/OEM can use proposed and existing DWDM Network of same OEM make components like chassis, OSC system and modules in MDWDM Network at common locations/paths without impacting traffic and functionality of DWDM Network. In case if the cards/modules/Licenses in the existing DWDM 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.

8. Vendor must ensure that proposed MDWDM system must have co-exist 10G & 100G channels in same fiber pair without any extra Hardware. MDWDM Network should be design as per traffic requirement.
9. The locations can be used as ILA & OADM locations. List of location and Segments for New MDWDM is placed at **Annexure-V**.
10. Bidder shall consider fiber losses 6 dB fiber repair margin and max fiber loss can be considered upto 33 db per span in New MDWDM backbone system (e.g. if current fiber losses is 30 db , fiber repair margin will be 3db, this will not applicable for those spans where optional ILA sites are available in annexure-I) . In case of span fiber loss is equal or more than 33 db in that case 1 dB additional fiber repair margin per span shall be considered. Bidder can also consider max 4 more optional ILA sites. Bidder is also required to submit full link budget calculation of required channels 8 along with input parameters Vs output of planning tool. Fiber Characteristic – Forward and reverse path for New MDWDM ILA /OADM and existing ADVA DWDM Network Locations are placed as **Annexure-IV**.

1.4 New DWDM and MDWDM System

1. Next Generation (NG) new DWDM and MDWDM system shall be based on state of art Modern technology which drives high capacity cost effectively and lowers operational cost. NG DWDM and MDWDM 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 proposed DWDM transponder shall support transmission of single carrier channel with Software Configurable 100G & 200G line rate as per link budget requirement and 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. Software Configurable 100G & 200G line rate will not be applicable for Muxponder (10X10G Clients) and Muxponder (10X10G Clients) shall support line rate and client rate as per traffic matrix requirement. DWDM link in Next Generation Optical Network shall be designed for 4 Tbps Capacity for DWDM and 800Gbps for MDWDM with End of Life (EoL) not less than 8 years.

The NG DWDM and MDWDM 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 Flex Grid C- band WSS at ROADMs sites in Backbone segment depicted in 1.2.1 for DWDM Network. Bidder shall propose minimum min. 8 Channel sites mux/demux with express port in OADM Sites for Metro DWDM.
3. WSS shall support full C-band spectrum i.e. 4000/4800 GHz for DWDM Network.
4. Bidder shall consider OEQ (Optical equalizations) & regenerator sites as per long-haul design requirement in backbone segment.
5. Bidder shall propose max two type of WSS module in DWDM Network 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.
6. Booster amplifier and pre amplifier shall be integral part of DWDM and MDWDM terminals, ILAs and OADMs/ ROADMs
7. The system shall support out of band FEC as per ITU-T Rec. G.709
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 for DWDM Network 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 DWDM equipment shall have the provision for monitoring the performance of individual channel through overhead byte of OTUn/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 100GHz. Any consecutive 40 wavelengths may be chosen by purchaser from DWDM- grid as specified in ITU-T Rec. G.694.1. If bidder opts to offer 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 be better than 50 dB
18. DWDM and MDWDM Line port shall be provided with tunable laser covering the complete C-band for 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 and MDWDM 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**
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 for ROADM/OADM site.
 - c. Total time taken for Fault detection and Switching from active to standby module should be less than 50 ms. There shall be no interruption to traffic.
24. **Optical Amplifier (Booster amplifier/Pre-amplifier/ILA) characteristic.**
 - a. They shall be EDFA amplifier.
 - b. Amplifiers shall support full C- band spectrum 4000/4800 GHz.
 - c. The technical requirements of parametric values, as per ITU-T.692, G.957, G.959.1 and other relevant ITU-T recs
 - d. The Optical Amplifiers shall be of 'Mid-Access/Single stage EDFAs/Dual stage EDFAs' type with due implementation for gain-flatness & feed-back gain-control etc. The Optical amplifiers have to work on 80 @ 50GHz or 40 @ 100GHz channels from day one.
 - e. 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.
 - f. 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:
 - g. Fast gain control loop: to protect against short term transient conditions such as sudden loss of channels.

- h. The above requirement shall hold for the optical amplifiers that are part of ROADM, Mux & Demux also.

25. Power Supply

- Nominal power supply is -48 V DC. The equipment shall work in the range -40 V Dc to -60 V DC.
 - 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.
 - The derived DC voltages in the equipment shall have protection against over- voltage, short circuit and overload.
 - The equipment shall have the option of operating from two independent sources of input power supply.
26. Bidder should propose new DWDM components for DWDM Network as per following tables for efficient operational practice

Sr. No.	Active Component	Types of Model allowed
1	Chassis (ROADM, OADM, Regen, ILA)	Max. Four Type
2	Amplifiers (Booster, Pre-Amp , Midstage and In-line Amplifier)	Max. Four types
3	WSS	Max. Two type
4	Mux/Demux (Ch. Add/drop)	Only One type
5	Inner Amplifier	Only One type

27. Performance Requirements:

- The equipment shall support the following performance parameters relating to the ODU-k as specified in ITU-T Recs.G.8201 and G.7710
- Optical Channel Transport Unit Background Block Error (OTU_ BBE).
- Optical Channel Transport Unit Errored Second (OTU_ ES).
- Optical Channel Transport Unit Severely Errored Second (OTU_ SES).
- Deleted.
- Optical Channel Data Unit Path Monitoring Background Block Error (ODU_PM_BBE).
- Optical Channel Data Unit Path Monitoring Errored Second (ODU_PM_ES)
- Optical Channel Data Unit Path Monitoring Severely Errored Second (ODU_PM_SES).
- Optical Channel Data Unit Path Monitoring Unavailable Second (ODU_PM_UAS).

28. Alarms:

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

- Input power failure of the Transponder/Mux-ponder interface (including Ethernet interfaces).
 - Input power failure of the Amplifiers
 - Output power failure of the Amplifiers
 - Fan/s failure
 - Input channel failure at Optical Add/Drop Multiplex equipment
 - Hardware mismatch alarm
 - Low input power at Transponder
 - Low input power at OA, Optical Add/Drop multiplex equipment
- These alarms shall be categorized as Critical, Major, Minor or Warning

29. The following ODU-k related alarms listed in ITU-T G.798 shall be reported by the equipment through the EMS
- OTU-k Loss of Frame alarm (OTU -LOF).
 - OTU-k Loss of Multiframe alarm (OTU -LOM).
 - Open Connection Indication alarm (OCI).
 - 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)

30. Optical Add/Drop Multiplex equipment characteristics for DWDM Network.

- 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 Flex Gird ROADM for Backbone segment.
- f. ROADM shall allow for remote configuration and reconfiguration
- g. ROADMs shall allow automatic power balancing.
- 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 a ROADM 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. Mux & Demux should be provided in each direction at ROADM sites.
- 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

31. The following client interfaces or combinations thereof shall be supported on proposed client interface in Backbone DWDM Network.

- 1) 100GE
- 2) OTU4

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

33. 100/200G for protected circuits 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/Degrade signal failure.
35. Proposed DWDM and MDWDM system shall be managed by NMS system for all the active component.
36. 100G Transponder & DWDM/MDWDM line 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
37. 100G Transponder shall provide following client protocol
 - a. 100GE
 - b. OTU4

38. **QUALITY ASSURANCE PROGRAM AND IMPLEMENTATION 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.

39. **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.

40. **SITE PREPARATION**

40.1 **RailTel's Responsibility**

Following shall be arranged by RailTel: -

- 40.1.1 Space/Buildings /equipment room for housing rack / space in rack for location of equipment.
- 40.1.2 -48 Volt DC power supply required for equipment.

40.1.3 Earthing of value less than 1ohm required for equipment.

40.1.4 Spare Fiber as applicable.

40.1.5 For the ILA and OADM Locations RailTel will provide space in Rack up to 8 RU for ILA site and 21 RU for OADM sites on standard 19” Telecom Rack. In case the offered ILA and OADM require more space in that case bidder shall provide the Rack.

40.1.6 -48 Volt DC Power Supply will be made available by RailTel (For the ILA 300W and for OADM 600W per direction) at locations adjacent/near to the Equipment.

40.1.7 In case the offered ILA and OADM require more – 48 Volt DC Power Supply in that case bidder shall provide DC Charger (N+1 SMR redundancy) and battery bank of the required capacity and same should be from approved make/model from RDSO/TEC. Two sets of 48 Volt DC Charger & Battery bank (Minimum 300AH) at OADM locations and One set of Charger & Battery bank (Minimum 200AH) at ILA locations should be provided by bidder with no additional cost to RailTel.

40.1.8 Earthing will be made available on Earthing bus- bar on the wall in equipment room. Racks if applicable (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

40.2 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.

40.2.1 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.

40.2.2 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

40.2.3 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.

40.2.4 FINAL COMMISSIONING

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.

40.3 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.

40.4 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.

40.5 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.

40.6 COMPLIANCE TO TECHNICAL REQUIREMENTS

40.6.1 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.

40.6.2 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."

40.6.3 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.

40.6.4 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. In case of a mismatch between tender technical requirement of Chapter- 3A and DWDM Technical Specifications of Chapter-8A, technical requirement of Chapter- 3A will prevail.

Proposed New DWDM and MDWDM System should support Alien wavelengths in optical & photonic layer without any restriction and no cost to RailTel.

(End of Chapter-3A)



CHAPTER-3B

NETWORK REQUIREMENTS AND EQUIPMENT CHARACTERISTICS

1. PROPOSED DWDM NETWORK

RailTel desires to create 100G network between Delhi-Kolkata, Delhi-Mumbai, Mumbai-Bangalore & Bangalore to Chennai and Mumbai -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 RKM. 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 in 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.
- 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.

- 8.2 For the ILA and OADM Locations RailTel will provide space in Rack up to 8 RU for ILA site and 21 RU for OADM sites on standard 19” Telecom Rack. In case the offered ILA and OADM require 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 for ROADM /OADM Chassis if its failure is traffic impacting and must be field replaceable.
- 9.4 Equipment should be telecom grade and depth of equipment should be preferably 300 mm to assure ample space for proper cable management at rear end.
- 9.5 100G client interface shall be LR4 with dual rate at Delhi and SR4 at other locations and 10G client interface shall be Single mode 1310 nm (10 km) with dual rate as per traffic matrix requirement.
- 9.6 Bidder can propose Regeneration (3R), if required.

(End of Chapter-3B)



CHAPTER-3C

TELECOM NETWORK MANAGEMENT SYSTEM

1.1 INTRODUCTION

The DWDM transport system shall be manageable by NMS system for all the active components . 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.

- 1.1.1 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:
- 1.1.2 The existing Network Management System's design concept, functional and informational architecture & physical architecture is in compliance with ITU-T recommendation M.3010.
- 1.1.3 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.

1.2 NETWORK MANAGEMENT

- 1.2.1 System shall conform to the Management System requirements of Technical specifications of DWDM in chapter 8(A).
- 1.2.2 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:
 - 1.2.2.1 The server shall be rack mountable.
 - 1.2.2.2 Processor: Xeon 8 Core Processor (2 Processors).
 - 1.2.2.3 DDR Memory- min 64 GB DDR3
 - 1.2.2.4 HDD- 2x 1 TB
 - 1.2.2.5 Hardware RAID O & I
 - 1.2.2.6 1GB E NC 326i 2 port smart array P 410i (storage controller)
 - 1.2.2.7 Fixed & single Power Supply
 - 1.2.2.8 DVD ROM
 - 1.2.2.9 Keyboard & Mouse
 - 1.2.2.10 18.5" LED Monitor
- 1.2.3 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.
- 1.2.4 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.

1.3 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.

- 1.3.1 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)



CHAPTER-3D

EMI, ENVIRONMENT AND POWER SUPPLY

1.1 ELECTROMAGNETIC INTERFERENCE

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.

1.2 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° to + 40° C guaranteed and upto +50° C degraded. STORAGE: -10° C to +70° C
2.	Humidity	At any relative humidity upto 95% within the temperature range of 0° C to 40° 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.

1.3 POWER SUPPLY ARRANGEMENT

- 1.3.1 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.
- 1.3.2 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.
- 1.3.3 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 8x100G 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.
- 1.4 PROTECTION AGAINST TRANSIENTS, SURGES AND LIGHTNING:**
- 1.4.1 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.
- 1.5 EARTHING**
- 1.5.1 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)



CHAPTER-3E

INSPECTION AND INSTALLATION, TESTING & COMMISSIONING

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

1.1 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 signals should be possible.

1.2 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:

- 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

iv) **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.

v) **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.

1.3 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.

1.4 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. In case of imported items, FAT may be conducted in India, if bidder can arrange all testing and measuring facilities in India. Technical parameters for testing in India shall be standard and as defined in the tender document. No additional cost shall be paid to OEM/bidder. 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.

1.5 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.

1.6 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.

1.7 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)

1.7.1 PROVISIONAL ACCEPTANCE CERTIFICATE (PAC)

On Installation of the equipment in the route and after conclusion of Site Acceptance Testing, Provisional Acceptance Certificate (PAC) will be issued by authorized representatives of concerned region so that trial run/ field trials can be started. Part PACs may also be issued for the route if required as per the site condition. If Part PACs are issued, PAC shall be issued after the completion of route and conclusion of site acceptance testing. 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.

1.8 SPARES

1.8.1 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.

1.8.2 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.

1.9 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 identify 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.

1.10 FINAL ACCEPTANCE

The final acceptance of the works completed shall take effect from the date of successful completion of 12 months of Maintenance Supervision, 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. 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.

1.11 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.
- 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.

1.12 TYPE TEST

- 1.12.1 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.
- 1.12.2 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.
- 1.12.3 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.
- 1.12.4 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.

- 1.12.4.1 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.
- 1.12.4.2 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.
- 1.12.4.3 The Tenderer shall ensure that all type tests can be completed within the time schedule mentioned in the tender schedule.
- 1.12.4.4 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.
- 1.12.4.5 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)



CHAPTER-3F

TRAINING, VENDOR DATA REQUIREMENT, DOCUMENTATION, AND DESIGN GUIDELINES

1.1 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.

1.2 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).

1.3 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 1.2 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)



CHAPTER 4A

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 of 120 days from the date of opening of tender including the date of opening.

2. Warranty

- 2.1 The warranty would be valid for a period of 36 months (comprising of 12 months of Maintenance supervision vide clause 2.5 below, between issue of PAC and FAC, followed by 24 months of warranty support under clause 2 & 2.4). 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 two qualified engineer at NOC location in each Region (8 in total) to the satisfaction of RailTel for level 2 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.

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 Chapter-7.

- 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 engineers 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 as per the instructions of Purchaser's Engineer 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 two NMS trained engineer shall be provided at the NOC location in each Region, 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 two qualified Engineer for level 2 support at NOC location in each Region (8 in total).

- 3.2 Tenderer/OEM 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 INR 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. This period of 5 year may be extended further with mutual consent of RailTel and Contractor.

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 LOA for AMC shall be issued by RailTel 3 months prior to the completion of warranty period and separate Agreement shall be signed with the tenderere/OEM. A fresh Bank Guarantee valid for a period 4 months beyond the completion of AMC from the date of LOA for 10% of the total AMC cost of five years shall be required to be submitted by OEM/ Tenderer for due fulfillment of long term maintenance support obligation. This PBG of AMC shall be submitted by the bidder within 30 days from the date of issue of LOA for the AMC. In case bidder does not submit the PBG in the stipulated time period, RailTel may encash the PBG given with the original LOA.

- 3.4 As part of level-2 support, two experienced engineer should be available at the NOC location in each Region 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 Regional General Managers/ Executive Director of the Regions.

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 chapter-7.

4. **Delivery, Installation and Commissioning period**

The materials as per SOR are required to be delivered, install and commission within 150 days from the issue of LOA/Purchase Order. The bidder is required to submit the PERT chart showing the various activities which are required for supply, installation, testing and commissioning of the equipment for each route. The materials shall be delivered 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.

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	Office	Address
1	Corporate Office	New Delhi	Executive Director /Project Plate-A, 6th Floor, Rail Nilayam, Office Tower-2, NBCC Building, East Kidwai Nagar, New Delhi-110023 Email: suresh@railtelindia.com
2	Northern Region	New-Delhi	Regional General Manager/ Executive Director 6th Floor, Block-III, Delhi IT Park, Shastri Park. Delhi-110053.
3	Eastern Region	Kolkata	Regional General Manager/ Executive Director 3 rd Floor, Chatterjee, International Centre,33-A Jawaharlal Nehru Road, Kolkatta-700071.
4	Southern Region	Secunderabad	Regional General Manager/ Executive Director 2nd Floor B-Block, Rail Nilayam, Secunderabad-500071.
5	Western Region	Mumbai	Regional General Manager/ Executive Director Western Railway Microwave Complex, SenapatiBapat Marg, Mahalaxmi, Mumbai- 400013.

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/ E-way bill
- (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.

Above payment may be made through LC on the request of the contractor, if submitted along with the bid.

The incidental cost towards issue of LC and operation thereof (LC operating charges, including bank charges for opening of LC) shall be borne by the supplier/Contractor.

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/RGM 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/Regions. Bills to be submitted to the ED/RGM of Regions 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 ED/RGM of Regions 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 ED/RGM of Regions 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 ED/RGM of Regions 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.
- 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 95% of the payment at the time of delivery. All the documents required will be as per clause 5.1 above. This payment may be made through LC on the request of the contractor, if submitted along with the bid. The incidental cost towards issue of LC and operation thereof (LC operating charges, including bank charges for opening of LC) shall be borne by the supplier/Contractor.
 - 5.8.2 Next 5% of the payment shall be made after expiry of one year from the date of delivery.

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 this Chapter.
- 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.
- 6.6 Wherever the contracts are rescinded, the security deposit/PBG shall be forfeited and the SD/Performance Bank Guarantee shall be en-cashed by RailTel.

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.
- 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 service support, the tenderer should have registration no. for GST 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. The Tenderer/bidder should be an Original Equipment Manufacturer (OEM) or authorized representative of OEM specifically authorized by OEM for bidding in this tender. OEM can authorize only one partner to participate in the tender.

- 12.1. The Equipment offered by the tenderer or equipment of the same series/family (an undertaking by the OEM has to be submitted in support in case of immediate predecessor) from

the same OEM should have been satisfactorily working in Government/PSUs/Telecom Service Providers network for 100G deployment of DWDM system for minimum length of 500 Kms for at least 12 months as on date of opening of tender, in India or Abroad. The certificates from the actual users will have to be submitted along with bid.

- 12.2 The Equipment offered by the tenderer or equipment of the same series/family (an undertaking by the OEM has to be submitted in support in case of immediate predecessor) from the same OEM should have been satisfactorily working in Government/PSUs/Telecom Service Providers network for 100G Alien wavelength deployment in live network over 3rd party DWDM network for minimum length of 500 Kms for at least 12 months as on date of opening of tender, in India or Abroad. The certificates from the actual users will have to be submitted along with bid.
- 12.3 The OEM should have supplied at least 35% of the tendered value of the equipment offered or equipment of the same series/family during last preceding 3 financial years (i.e. current year and three previous financial years) as on opening of bid to Government/PSUs/Telecom Service Providers. OEM should submit self-certificate with proper contact detail of clients along with PO reference and amount supplied (Firm Name, Contact person, Designation, Telephone Number, Fax, Official mail id etc.). The same should be issued by authorized signatory.
- 12.4 OEM should have proven facilities for Engineering, manufacture, assembly, integration and testing of DWDM System and basic facilities with respect to space, Engineering, Personnel, Test equipment, Manufacture, Training, Logistic Supports for at least past three years in the country from where the proposed equipment are planned to be supplied. In case OEM is located outside India, it should have training, repair and service center facilities in India for a minimum period of 2 years. The certificates/Undertaking along with the complete address for the same will have to be submitted along with bid. Tenderers shall submit a declaration with the supporting documents (eg. registration, proof of supply of equipment).
- 12.5 The tenderer should have executed Single order of similar work[#] costing not less than 35% of the tendered value during last preceding 3 financial years (i.e. current year and three previous financial years) from the date of opening of tender. Completion of work should fall in the above period. The bidder shall also furnish work completion/ substantial work completion certificate issued by customer/s for the Purchase Orders/ Work Orders. Substantial completion shall be 80% (value wise) or more works completed under the contract. For contracts under which bidder participated as a Joint Venture member or sub-contractor, only the bidder's share, by value, shall be considered to meet this requirement.

Similar Work "Turnkey projects of Telecom Transmission Network/OFC Communication Network/ IP-VPN Data Network/ Broadband Network/ Next Generation network/ Radio Network in Government/PSUs/Telecom Service Providers network/ISP Network".

For Startups :- The bidder should have executed order during the last preceding 3 financial years (i.e. current year & three previous financial years) as on opening of bid, as per following:

- a) Single order of atleast 35% of tendered value
OR
- b) Two orders of atleast 20% each of tendered value
OR

- c) Three orders of atleast 15% each of tendered value

12.6 The tenderer should have minimum cumulative turnover of 150% of tendered value or above during the last 3 financial years (i.e. current year and/or three previous financial years). The bidder should provide Audited Balance Sheets / annual reports as documentary evidence and for current year, the Statutory Auditor's certificate for turnover of current year up to the date of bid opening for which Balance Sheet/P&L may not be available. In case of photocopy of Balance Sheet/P&L the same should be certified by Chartered Accountant as true copy.

For Startups:- The tenderer should have annual turnover of minimum 50% of tendered value or above during the preceding 3 financial years as on opening of bid.

12.7 The tenderer should have registered office in India for a minimum period of 3 years as on scheduled date of bid opening. Certificate of incorporation will have to be submitted.

12.8 The tenderer should have authorization specific to this tender from respective OEM as per Form no. 5 of Chapter-6.

12.9 The Bidder or their promoters having equity stake or operating partnership in bidder, should not be holding valid License for Telecom service provider/ISP/NLD, Services License of Government of India for Telecom Operation.

12.10 The tenderer and OEM should not have been banned/Black listed by any Govt./Semi Govt./PSU/State Govt./Any Telecom entity in India for the supply of the material. An undertaking to this effect signed by the authorised signatory to be submitted by the bidder.

12.11 In the event of Foreign Original Equipment Manufacturer (OEM), Indian Subsidiary or it's 100% subsidiary fully authorized for bidding on behalf of OEM is allowed to participate with the experience and financial credential of parent company with specific authorization for doing so from the OEM. The specific authorization addressed to RailTel should be submitted by the tenderer.

12.12 Tenderer shall submit proper contact detail of clients (Firm Name, Contact person, Designation, Telephone Number, Fax, Official mail id etc.) along with certificates as asked above. The bidder is required to submit complete chain of credentials, e.g. purchase order(prices blanked out), showing relevant value of the PO and satisfactory working/implementation certificate issued by the user/customer. Purchase orders without relevant organization's confirmation through a credential letter will not be considered as implementation certificate from the client.

12.13 All the document should be in English/Hindi language only. Document other than English/Hindi will not be entertained. However, Tech. Specification and details should be in English only.

12.14 The tenderers shall submit a notarized affidavit on a non-judicial stamp paper stating that they are not liable to be disqualified and all their state-ment/documents submitted alongwith bid are true and factual. Standard format of the affidavit to be submitted by the bidder is enclosed as Form No. 12 of Chapter-6. Non submission of an affidavit by the bidder shall result in sum-mary rejection of his/their bid. And it shall be mandatorily incumbent upon the

tenderer to identify, state and submit the supporting documents duly self attested by which they/he is qualifying the Qualifying Criteria mentioned in the Tender Document. It will not be obligatory on the part of Tender Committee to scrutinize beyond the submitted document of tenderer as far as his qualification for the tender is concerned. The RailTel (RCIL) reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the RailTel (RCIL), make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification by the RailTel (RCIL) shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any rights of the railway thereunder. In case of any wrong information submitted by tenderer, the contract shall be terminated. Earnest Money Deposit (EMD), Performance Guarantee (PG) and Security Deposit (SD) of contract forfeited and agency barred for doing business on RailTel (RCIL) for 5 (five) years.

13. CONSORTIUM BIDS

1. In view of nature of work covered in the Bid documents, it is anticipated that some of the intending tenderers will pool their resources and experience to form consortia. Consortium bids are permitted with OEM as lead bidder.
2. However, without prejudice to clause 5, if OEM is not able to become the lead bidder in the Consortium and is one of the consortia partners, then in such cases:
 - 2.1. OEM will be required to keep posted at least a Project Manager specifically for RailTel's project associated till its completion.
 - 2.2. OEM shall submit the system performance guarantee along with the tender.
 - 2.3. OEM shall submit the commitment of Long Term System Support in terms of clause 3 of Chapter-4.
 - 2.4. Lead bidder should have experience of execution of turnkey similar projects/Works.

In their own interest the tenderers who form such a consortia are advised to investigate capabilities, availability of resources, experienced personnel, financial soundness, past experience and concurrent engagements of constituting partners.

3. Consortia of tenderers, if any, must clearly define role/scope of work of each partner/member. Further the legal agreement for a consortium must accompany the bid and should clearly define the leader of such a consortium who will be the contractor and will be responsible for timely completion of work as also during execution of work, if awarded, coordinate with Purchaser on behalf of the consortium, receive payments for the works executed and be liable for due performance of the contract in all respect.
4. Qualification documents, details etc. must however, be provided for each member firm complete in all respects.
5. A consortium formed will not be subject to alteration with regard to change in constituting firms and/or reorientation of roles. Any changes, if proposed by consortium to take advantage of certain developments during evaluation stage will render the bid liable to be rejected. As all details are required to be furnished along

with the bids and will be critically examined during evaluation of bids, it is imperative that such details should have been thoroughly examined as a safeguard against a possible disqualification of bids on these grounds.

6. All partners of the consortium shall be jointly and severally liable to RailTel for the execution of the entire contract in accordance with its terms.
7. Consortium shall not have more than three members. Each Consortium member shall have minimum 20% contribution in the work. A Consortium must submit a Power of Attorney by the other member of the Consortium in favor of the Lead Member. This is also to be enshrined in Memorandum of Agreement signed by the Consortium Members and submitted along with the bid. Both members of consortium should sign every sheet of price bid as a token of acceptance of all quoted prices by both members, failing which the offer will stand summarily rejected.
8. An individual bidder or a member of Consortium cannot be a member of another Consortium or a JV partner and participate in this tender.
9. Firms should submit the affidavit (As per Form No. 8) & Consortium Agreement (As per Form No. 9) along with the bid/offer and original copy shall be submitted by the bidder before due date and time of tender submission at RailTel Corporate Office.
10. Each Consortium members shall make equal contribution towards total PBG amount to be submitted along with acceptance of APO/SPOs.

14. Participation Of Joint Venture (JV) Firms In Works Tender :

1. Separate identity/name shall be given to the Joint Venture Firm.
2. Number of members in a JV Firm shall not be more than three.
3. A member of JV Firm shall not be permitted to participate either in individual capacity or as a member of another JV Firm in the same tender.
4. The tender form shall be purchased and submitted only in the name of the JV Firm and not in the name of any constituent member.
5. Normally Earnest Money Deposit (EMD) shall be submitted only in the name of the JV Firm and not in the name of constituent member. However, in exceptional cases, EMD in the name of Lead Member can be accepted subject to submission of specific request letter from Lead Member stating the reasons for not submitting EMD in the name of JV Firm and giving written confirmation from JV members to the effect that EMD submitted by the Lead Member may be deemed as EMD submitted by JV Firm.
6. One of the members of the JV Firm shall be its Lead Member who shall have a majority (at least 51%) share of interest in the JV Firm. The other members shall have a share of not less than 20% each. In case of JV Firm with foreign member(s), the Lead Member has to be an Indian Firm with a minimum share of 51%.
7. A copy of Memorandum of Understanding (MoU) executed by the JV members shall be submitted by the JV Firm alongwith the tender. The complete details of the members of the JV Firm, their share and responsibility in the JV Firm etc. particularly with reference

to financial, technical and other obligations shall be furnished in the MoU. (The MoU format for this purpose shall be finalized by the RailTel in consultation with their law branch and shall be enclosed along with the tender).

- 8 Once the tender is submitted, the MoU shall not be modified / altered / terminated during the validity of the tender. In case the tenderer fails to observe/comply with this stipulation, the full Earnest Money Deposit (EMD) shall be liable to be forfeited.
- 9 Approval for change of constitution of JV Firm shall be at the sole discretion of the RailTel. The constitution of the JV Firm shall not be allowed to be modified after submission of the tender bid by the JV Firm, except when modification becomes inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. However, the Lead Member shall continue to be the Lead Member of the JV Firm. Failure to observe this requirement would render the offer invalid.
- 10 Similarly, after the contract is awarded, the constitution of JV Firm shall not be allowed to be altered during the currency of contract except when modification become inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. Failure to observe this stipulation shall be deemed to be breach of contract with all consequential penal action as per contract conditions.
- 11 On award of contract to a JV Firm, a single Performance Guarantee shall be submitted by the JV Firm as per tender conditions. All the Guarantees like Performance Guarantee, Bank Guarantee for Mobilization Advance, Machinery Advance etc. as per the tender shall be accepted only in the name of the JV Firm and no splitting of guarantees amongst the members of the JV Firm shall be permitted.
- 12 On issue of APO (Advance Purchase Order)/LOA (Letter Of Acceptance), an agreement among the members of the JV Firm (to whom the work has been awarded) shall be executed and got registered before the Registrar of the Companies under Companies Act or before the Registrar/Sub-Registrar under the Registration Act, 1908. This JV Agreement shall be submitted by the JV Firm to the RailTel before signing the contract agreement for the work. In case the tenderer fails to observe/comply with this stipulation, the full Earnest Money Deposit (EMD) shall be forfeited and other penal actions due shall be taken against partners of the JV and the JV. This Joint Venture Agreement shall have, inter-alia, following Clauses:
 - 12.3 **Joint And Several Liability** - Members of the JV Firm to which the contract is awarded, shall be jointly and severally liable to the (RailTel) for execution of the project in accordance with General and Special Conditions of Contract. The JV members shall also be liable jointly and severally for the loss, damages caused to the RailTel during the course of execution of the contract or due to non-execution of the contract or part thereof.
 - 12.4 **Duration of the Joint Venture Agreement** - It shall be valid during the entire currency of the contract including the period of extension, if any and the maintenance period after the work is completed.
 - 12.5 **Governing Laws** - The Joint Venture Agreement shall in all respect be governed by and interpreted in accordance with Indian Laws.

- 13 **Authorized Member** - Joint Venture members shall authorize one of the members on behalf of the Joint Venture Firm to deal with the tender, sign the agreement or enter into contract in respect of the said tender, to witness joint measurement of work done, to sign measurement books and similar such action in respect of the said tender/contract. All notices/correspondences with respect to the contract would be sent only to this authorized member of the JV Firm.
- 13.1. Any Payment shall be released to the Joint Venture and not to the one member and accordingly Joint Venture shall have PAN of the Joint Venture firm.
14. No member of the Joint Venture Firm shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other members and that of the RailTel in respect of the said tender/contract.
15. Documents to be enclosed by the JV Firm alongwith the tender :
- 15.1. In case one or more of the members of the JV Firm is/are partnership firm(s), following documents shall be submitted:
- (a) Notary certified copy of the Partnership Deed,
 - (b) Consent of all the partners to enter into the Joint Venture Agreement on a stamp paper of appropriate value (in original).
 - (c) Power of Attorney (duly registered as per prevailing law) in favour of one of the partners of the partnership firm to sign the JV Agreement on behalf of the partnership firm and create liability against the firm.
- 15.2. In case one or more members is/are Proprietary Firm or HUF, the following documents shall be enclosed:
- Affidavit on Stamp Paper of appropriate value declaring that his/her Concern is a Proprietary Concern and he/she is sole proprietor of the Concern OR he/she is in position of "KARTA" of Hindu Undivided Family (HUF) and he/she has the authority, power and consent given by other partners to act on behalf of HUF.
- 15.3. In case one or more members is/are limited companies, the following documents shall be submitted:
- (a) Notary certified copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement, authorizing MD or one of the Directors or Managers of the Company to sign JV Agreement, such other documents required to be signed on behalf of the Company and enter into liability against the company and/or do any other act on behalf of the company.
 - (b) Copy of Memorandum and Articles of Association of the Company.
 - (c) Power of Attorney (duly registered as per prevailing law) by the Company authorizing the person to do/act mentioned in the para (a) above.
- 15.4. All the Members of JV shall certify that they are not black listed or debarred by RailTel, Railways or any other Ministry / Department / PSU (Public Sector Undertaking) of the Govt. of India/State Govt. from participation in tenders/contract on

the date of opening of bids either in their individual capacity or as a member of the JV Firm in which they were/are members.

16. Credentials & Qualifying Criteria : Technical and financial eligibility of the JV Firm shall be adjudged based on satisfactory fulfillment of the following criteria :

16.1. Technical Eligibility Criteria : Either the JV Firm or Lead Member of the JV Firm must comply clause 12 of Chapter-4A.

Note : Value of a completed work done by a Member in an earlier JV Firm shall be reckoned only to the extent of the concerned member's share in that JV Firm for the purpose of satisfying his/her compliance to the above mentioned technical eligibility criteria in the tender under consideration.

16.2. Financial Eligibility Criteria: The contractual payments received by the JV Firm or the arithmetic sum of contractual payments received by all the members of JV Firm in the previous three financial years and the current financial year upto the date of opening of tender shall be at least 150% of the estimated value of the work as mentioned in the tender.

Note : Contractual payment received by a Member in an earlier JV Firm shall be reckoned only to the extent of the concerned member's share in that JV Firm for the purpose of satisfying compliance of the above mentioned financial eligibility criteria in tender under consideration.

17. Firm shall submit the affidavit (as per Form No. 8) and Joint Venture Agreement/Memorandum of Agreement (as per Form No. 10) along with the bid and original copy shall be submitted by the bidder before due date and time of tender submission at RailTel Corporate Office.

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. Deleted

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 Chapter-2. 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 Rate Contract:

- 18.2.1 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.

18.2.2 In addition to above, RailTel may again enter into Rate Contract after rate negotiation with the contractor for items detailed in SOR for catering of requirement of Equipment & cards. During the validity of Rate Contract, RailTel will place Sub Purchase Orders for Equipment detailed in SOR, as per requirement at the negotiated and approved rate. The contractor shall have to supply material against these Sub Purchase Orders within 60 days from the date of issue of such Sub Purchase Orders. Other terms and conditions of this contract shall be followed.

18.2.3 The payment conditions against Rate Contract will be as under:

18.2.3.1 75% of the payment at the time of delivery as per clause 5.1 of this Chapter-4A.

18.2.3.2 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-4A.

18.2.3.3 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-4A.

18.2.3.4 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-4A.

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 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 pay online through eNivida portal a sum as given in Bid Data Sheet (BDS) Chapter 5 as Earnest Money and submit e-recipient along with the bid. EMD in no other form shall be accepted.
- 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 without 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.

23. For Micro and Small Enterprises (MSEs)

- 23.1 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.

23.2 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.

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

23.4 Failing 23.2 and 23.3 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), Standard Conditions applicable for AMC (Chapter-6) 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.

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

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

This e-tender should be duly submitted online using e-Procurement Portal <https://railtel.enivida.com>.

- a. The offer shall be submitted in two packet on eNivind Portal as per instructions given in chapter-4B & 4C of tender.
- b. Tenderer shall quote in SOR provided in eNivida portal. In case the schedule of requirement quoted by tenderer is incomplete with reference to tender document, the offer is liable to be rejected.
- c. Any document submitted/uploaded in eNivida portal must be duly signed & stamped by the tenderer in each page.

- d. The rates quoted should be written both in words and figures. The unit of rates should be in metric system and as per tendered specification/schedule. In case of difference between words and figures, the rate in words will prevail. If there is a discrepancy between the unit price and total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected by the purchaser accordingly.
- e. Tenderers are requested to go through all the conditions of the tender document and note that, by submitting the tender documents, duly signed, they have accepted these conditions and undertake to abide by these conditions (unless specifically disagreed to clause wise).
- f. **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.

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:

41.1 Preference to Make in India: The provisions of the Public Procurement (Preference to Make in India) Order 2017 dated June 15, 2017 (or subsequent revisions, if any) by Department of Industrial Policy and Promotion, GoI shall apply to this tender to the extent feasible. Minimum Local Content for DWDM shall be 60% for purchase preference as per the Notification No. 18-10/2017-IP dated 29th August 2018 issued by Department of Telecommunications, Ministry of Communications or as per the latest notification for FY 2020-21. Bidder shall be required to give a self certification in his bid that the item offered meets the local content and shall give details of the localation(s) at which the local value addition is made. Further the bidder shall provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content. In case of any false declaration, action shall be taken in line with the provisions of the PPP-MIII order.

Office Memorandum Dated 19.02.2020 (or latest) issued by Department of Telecommunications, Ministry of Communications shall be applicable for Clause 10(d) of Public Procurement (Preference to Make in India) Order, 2017.

41.2 Bidders sharing a land border with India: Office Memorandum F.No.6/18/2019-PPD dated 23.07.2020 by Ministry of Finance, Department of Expenditure, Public Procurement Division shall also apply to this tender. A certificate as per Annexure-VI shall be submitted by all the bidders regarding their compliance with this order. If such certificate given by a bidder whose bid is accepted is found to be false, this would be a ground for immediate termination and further legal action in accordance with law. Registration should be valid at the time of submission of bids and at the time of acceptance of bids. In respect of supply otherwise than by tender, registration should be valid at the time of placement of order.

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 Portal 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. Integrity Pact Program

- a) RailTel has adopted Integrity Pact Program and for implementation thereof all tenders relating to procurement of OFC, quad cable, pre-fab shelters, electronic equipments and its installation and/or commissioning etc and other item(s) or activity/activities proposed to be carried out or required by the Company for the value exceeding Rs. 15 crores at a time including for repair and maintenance of cable/network and any other items required for special works assigned to RailTel will be covered under the Integrity Pact Program and the vendors are required to sign the IP document and submit the same to RailTel before or along with the bids.
- b) Only those vendors who have purchased the tender document and signed the IP document can send their grievances, if any, to the Independent External Monitors (IEMNs) through the nodal officer, i.e. Chief Vigilance Officer (CVO), RailTel.

Name of IEMs and contact details:

- 1. Mrs. Vijaya Kanth E-Mail: vykanthmrl2003@yahoo.com
- 2. Sh. Vinayaka Rao Turaga E-mail: tvrao56@gmail.com

Name & contact details of Nodal Officer (IP) in RailTel:

Sh. Mukesh Kumar, Chief Vigilance Officer

e-mail: cvo@railtelindia.com

- c) If the order, with total value equal to or more than the threshold value, is split to more than one vendor and even if the value of PO placed on any/each vendor(s) is less than the

threshold value, IP document having been signed by the vendors at bid stage it- self, the Pact shall continue to be applicable.

- a) Bidder of Indian origin shall submit the Integrity Pact (in 2 copies) on a non judicial stamp paper of Rs. 100/- duly signed by the person signing the bid. If the bidder is a partnership or a consortium, the Integrity Pact shall be signed by all the partners or consortium members.
- b) Bidder of foreign origin may submit the Integrity Pact on its company's letterhead, duly signed by the person signing the bid.
- c) The 'Integrity Pact' shall be submitted by the Bidder duly signed in all pages along with the Bid. The original copies shall be submitted to RailTel Corporate office in a separate envelope, duly superscripted with 'Integrity Pact' before due date and time of bid submission. Tender received without signed copy of the Integrity Pact document will be liable to be rejected. Proforma (Form no. 11) for signing the Integrity Pact is enclosed in Chapter-6 of tender document.
- d) One copy of the Integrity Pact shall be retained by RailTel and the 2nd copy will be issued to the representative of the bidders during bid opening. If the Bidder's representative is not present during the Bid opening, the 2nd copy shall be sent to the bidder by post/courier.
- e) The Integrity Pact is applicable in this tender vide CVC circular no. 10/05/09 dt. 18.05.09 and revised guideline of CVC circular no. 015/VGL/091 dt. 13.01.17 or the latest updated from time to time shall be followed.

(End of chapter- 4A)



CHAPTER-4B

INSTRUCTIONS TO THE BIDDERS

General

These are the Special Instructions to the Bidders for Tendering.

The RailTel Tenders are published on www.railtelindia.com and on e-Procurement Portal <https://railtel.enivida.com>

For E-Tendering bids /information by bidders is to be submitted “Online” on e-Procurement Portal <https://railtel.enivida.com>. Any document / information pertaining to this tender will have to be submitted by the bidder on line. The digital signature of the tenderer on the e-tender form will be considered as confirmation that the tenderer has read, understood and accepted all the documents, unless special deviation is quoted by the tenderer in the technical & commercial deviation templates.

PLEASE NOTE

ALL COLUMNS SHOULD BE FILLED AND BLANK COLUMNS, IF ANY, SHOULD BE MARKED AS NIL.

PLEASE READ CAREFULLY ALL THE CLAUSES OF THE TENDER BEFORE UPLOADING THE TENDER FORM. PLEASE SIGN ON EACH PAGE.

THE TENDERER MAY DOWNLOAD TENDER FORM FROM THE WEB SITE ‘www.railtelindia.com’ OR FROM THE e-Procurement Portal <https://railtel.enivida.com>,

NOTE: For online bid submission the tenderer will have to necessarily download an official online copy of the tender documents from e-Procurement Portal <https://railtel.enivida.com>, and this should be done well before the deadline for bid-submission.

1.0 Submission of the bid:

The bidder is required to submit the Technical bid and Price bid in eNivida portal before due date & time of submission of bids specified in this tender document.

2.0 Following documents shall be submitted in Technical and Price bid as given below:

(a) “TECHNICAL BID”; -The bid shall consist of the following:-

- 1) Offer Letter complete.
- 2) Signed Copy of Tender Document/ Corrigenda
- 3) **E-receipt of EMD**
- 4) **E-receipt of Tender fee.**
- 5) **Power of attorney** to be submitted in accordance with Clause-36.5, Chapter-4A of Tender Document.
- 6) **Indemnity Bond** (Form No. 7 of Chapter-6).
- 7) **In case bidder happens to be an eligible MSE**, the documentary evidence for same shall be submitted (clause 23, chapter-4A).

- 8) Specific authorization addressed to RailTel from the OEM (Parent Company) for Indian Subsidiary or authorized partner i.e. **Manufacturer Authorization Form** (Form no. 5 of Chapter-6).
- 9) Technical proposal, Design document along with the Solution of tenderer in conformity with system requirement of the tenderer, if any.
- 10) 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.
- 11) **System Performance Guarantee** (form no. 2, chapter-6).
- 12) **Acceptance for Long Term Maintenance Support** as per Clause 3.5, Chapter-4A of Tender Document (form no. 3, chapter-6).
- 13) Declaration regarding acceptance of clarification issued from DoT (Clause 17.2, Chapter 4A of Tender Document).
- 14) Schedule of Requirements with quantities but with prices blanked out (this will be a replica of price bid with prices blanked out) and detailed unpriced Bill of Material including break up of common units/cards/backplane/Fan Tray unit etc. for building up the SOR items for supply. Route wise breakup of SOR & BOM.
- 15) Clause wise compliance to tender conditions.
- 16) Documentary proof of qualifying criteria (Clause 12 of Chapter 4A 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) Form no. 4,6,11 & 12 of Chapter-6.
- 18) Form No. 8,9 & 10 of Chapter-6, if applicable
- 19) Certificate of Local Content, if applicable as per clause 41.1, Chapter-4A
- 20) Certificate by bidders sharing a land border with India as per clause 41.2, Chapter-4A
- 21) Any other document asked in the tender but not listed above.
- 22) Any Other information desired to be submitted by the tenderer.

b) “Price Bid” Shall contain

The price bid for “Schedule of requirements” as per Note of Chapter 2 along with “Bill of Material” (BOM) for each item quoted exactly according to the proforma, as also submitted along with “Technical Bid”. Breakup of SOR as well as BOM with price shall be submitted by the tenderer for each route of DWDM & MDWDM mentioned in Chapter-3 of tender document

Note: Non submission of the above-mentioned documents may lead to rejection of the 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 & eNovida portal. 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) in eNovida portal as per date & time given in the Bid Data Sheet (BDS).
2. 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.
3. Bids received after due date and time shall be summarily rejected and shall not be opened.

7.0 Submission of offline documents:

Original copy of following documents shall be submitted by tenderer offline at RailTel Corporate Office, East Kidwai Nagar, New Delhi before due date & time of submission of bid:

- a. Power of Attorney.
- b. Original copies of Form No. 2 (System Performance Guarantee), Form No. 7 (Standing Indemnity Bond), Form no. 8 (Affidavit), Form no. 9 (Consortium agreement), Form No. 10 (Joint venture agreement), Form No. 11 (Integrity Pact) and Form no. 12 (Affidavit).

The packet containing the original copies as per above should be sealed by the personal seal of the bidder. The envelop shall bear name of work, the tender no. and the words "DO NOT OPEN Before" (-due date and time -).

8.0 Pre bid Conference & Clarification Requests:

Pre-bid conference for this tender will be held on 15.12.2020 at 15:00 hrs. in Corporate Office of RailTel Corporation of India Ltd., Plate-A, 6th Floor, Office Tower-2, NBCC Building, East Kidwai Nagar, New Delhi-110023. The bidders who have purchased tender document will be allowed to attend Pre-bid conference. Prebid conference may also be held through Video Conference (VC) for which link shall be shared by RailTel through email to those tenderers who shall submit the queries.

It is solicited that the written queries/ clarification request may be sent to RailTel's office through e-mail to netesh@railtelindia.com with copy to ravi_viswakarma@railtelindia.com and suresh@railtelindia.com (in pdf & word or excel format) or by post latest by the date as indicated

in the Bid Data sheet (BDS). All relevant clarifications sought will be addressed during the pre-bid meeting. Clarifications sought shall be submitted in the following format:

SN	Clause no. & Chapter no.	Page no.	Sub-clause no./ Point no.	Content of the clause requires clarification	Points of clarification required

(End of Chapter- 4B)

CHAPTER-4C**E-tendering Instructions to Bidders****GENERAL:**

These Special Instructions (for e-Tendering) supplement 'Instruction to Bidders', as given in Chapter-4B of the Tender Document. Submission of Bids only through online process is mandatory for this Tender.

E-Tendering is a new methodology for conducting Public Procurement in a transparent and secured manner. Now, the Government of India has made e-tendering mandatory. Suppliers/ Vendors will be the biggest beneficiaries of this new system of procurement. For conducting electronic tendering, RailTel has decided to use the portal <https://railtel.enivida.com>.

Bidder Enrolment can be done using "**Online Bidder Enrolment**".

The instructions given below are meant to assist the bidders in registering on the e-tender Portal, and submitting their bid online on the e-tendering portal as per uploaded bid.

More information for submitting online bids on the eNivida Portal may be obtained at:

<https://railtel.enivida.com>

GUIDELINES FOR REGISTRATION:

1. Bidders are required to enroll on the e-Procurement Portal:
<https://railtel.enivida.com/bidderRegistration/newRegistration> or click on the link "**Bidder Enrolment**" available on the home page of e-tender Portal by paying the Registration fee of Rs.2000/-+Applicable GST.
2. As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their account.
3. Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication with the bidders.
4. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (**Only Class III Certificates with signing + encryption key usage**) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.) with their profile.
5. Only valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
6. Bidder then logs in to the site through the secured log-in by entering their user ID /password and the password of the DSC / e-Token.
7. The scanned copies of all original documents should be uploaded in pdf format on e-tender portal.

8. After completion of registration payment, bidders need to send their acknowledgement copy on our help desk mail id eprocurement@railtelindia.com for activation of account.

SEARCHING FOR TENDER DOCUMENTS:

1. There are various search options built in the e-tender Portal, to facilitate bidders to search active tenders by several parameters.
2. Once the bidders have selected the tenders they are interested in, bidders can pay the Tender fee and processing fee (NOT REFUNDABLE) by net-banking / Debit / Credit card then bidder may download the required documents / tender schedules, Bid documents etc. Once bidder pay both fee tenders will be moved to the respective 'requested' Tab. This would enable the e- tender Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.

PREPARATION OF BIDS:

1. Bidder should take into account any corrigendum published on the tender document before submitting their bid.
2. Please go through the tender notice and the tender document carefully to understand the documents required to be submitted as part of the bid.
3. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF formats. Bid Original documents may be scanned with 100 dpi with Colour option, which helps in reducing size of the scanned document.
4. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, GST, Annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Documents" available to them to upload such documents.
5. These documents may be directly submitted from the "My Documents" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process. Already uploaded documents in this section will be displayed. Click "New" to upload new documents.

SUBMISSION OF BIDS:

1. Bidder should log into the website well in advance for the submission of the bid so that it gets uploaded well in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
2. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document as a token of acceptance of the terms and conditions laid down by RailTel.
3. Bidder has to select the payment option as "e-payment" to pay the tender fee / EMD as applicable and enter details of the instrument.

4. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BOQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BOQ file, open it and complete the white Colored (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the file name. If the BOQ file is found to be modified by the bidder, the bid will be rejected.
5. The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
6. The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
7. Upon the successful and timely submission of bid click "Complete" (i.e. after Clicking "Submit" in the portal), the portal will give a successful Tender submission acknowledgement & a bid summary will be displayed with the unique id and date & time of submission of the bid with all other relevant details.
8. The tender summary has to be printed and kept as an acknowledgement of the submission of the tender. This acknowledgement may be used as an entry pass for any bid opening meetings.

For any clarification in using eNvida Portal:

1. Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.
2. Any queries relating to the process of online bid submission or queries relating to e-tender Portal in general may be directed to the Helpdesk Support.

Please feel free to contact eNvida Helpdesk (as given below) for any query related to e-tendering.

Phone No. 011-49606060/8448288988

Mail id: - eprocurement@railtelindia.com

(End of Chapter- 4C)

CHAPTER- 5

BID DATA SHEET (BDS)

The section consists of provisions that are specific to various Clauses of the tender document.

Clause	Description
Clause 1.2, Chapter-4A	Validity of offer 120 days.
Clause 2.1, Chapter-4A	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 3.1, Chapter-4A	Long Term Maintenance Support (AMC) 5 Years from the date of completion of Warranty.
Clause 4, Chapter-4A	Delivery, installation & Commissioning period 150 days from date of issue of LOA/Purchase Order.
Clause 6, Chapter-4A	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 45 months from the date of issue of LOA.
Clause 12, Chapter-4A	Qualifying Criteria
Clause 18.1, Chapter-4A	Purchaser's Right to Vary Quantities up to a maximum extent of +/- 30% of contract quantity.
Clause 22.1, Chapter-4A	Earnest Money Deposit (EMD)/ Bid Security Rs. 21.5 Lacs/-
Clause 8.0, Chapter-4B	Last date of submission of queries/ clarification request Date: 08.12.2020 Prebid Conference: Date: 15.12.2020 at 15:00 hrs
Tender Notice	Last date & time of submission of offer (Online) Date: 30.12.2020 Time: 15:00 hours
Clause 37.1, Chapter-4A	Date & time of Opening of Tender (Online) Date: 30.12.2020 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)

CHAPTER- 6

Form No. 1

PROFORMA FOR PERFORMANCE BANK GUARANTEE PERFORMANCE BANL GAURANTEE 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., 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 Agreement 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 and our local branch at New Delhi (indicate detail address of local New Delhi branch with code no.) 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.

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).

We, the Bank further agree that this guarantee shall be invokable at our place of business at/New Delhi (indicate detailed address of local New Delhi Branch with code no.). The branch at New delhi is being advised accordingly.

(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.

Dated the day of ,2020

for
(indicate the name of the Bank)

Witness

1. Signature
 Name
2. Signature
 Name



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.

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RAILTEL

Form No. 3

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

To

**Executive Director, Project
RailTel Corporation of India Limited,
Plate-A, 6th Floor, Office Tower-2,
NBCC Building, East Kidwai Nagar,
New Delhi-110023**

Applicable for OEM directly participating in the tender

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

Or

Applicable for Authorized Distributor/Partner of OEM

I / We hereby confirm that we have read specifications & tender conditions of RailTel Tender No.and accept that the requirement of Long Term Maintenance Support as per Clause 3 of Chapter-4A shall be met **by Authorized Distributor/Partner of OEM. However, if Authorized Distributor/Partner fails to fulfil the support obligation due to any un-foreseen circumstances, the same shall be provided by us directly or through our subsidiary in India for the mentioned/remaining period at the quoted prices by the bidder. 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.

RAILTEL

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	EMD & Tender fee	
3	Offer Letter duly signed by authorized signatory (Chapter -1 of Tender Document)	
4	Specific authorization addressed to RailTel from the OEM for its Indian Subsidiary or authorized partner. (Clause 12.8, Chapter- 4A of Tender Document, Form No. 5, Chapter-6)	
5	Power of Attorney to Signing the Bid (Clause 36, Chapter- 4A of Tender Document)	
6	Clause wise compliance (Clause 25.1 of Chapter-4A)	
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- 4A of Tender Document)	
8	Form no. 2 (System Performance Guarantee) (Clause 15.2 Chapter-4A of Tender Document)	
9	Form no. 3 (Undertaking for Long Term Maintenance Support from OEM) (Clause 3, Chapter-4A of Tender Document)	
10	Documentary proof for qualifying criteria (Clause 12, Chapter 4A 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. 6 of Chapter-6- RTGS Payment	
13	Form No. 7 of Chapter-6- Indemnity Bond.	
14	Form No. 8, 9 & 10 of Chapter-6, if applicable	
15	Form No. 11 of Chapter-6- Integrity Pact	
16	Form No. 12 of Chapter-6- Affidavit as per clause 12.13 of	

SN	Item/Clause of Tender Document	Details/Remarks
	Chapter- 4A	
17	Schedule of Requirements (with Price) & Route wise breakup of SOR as per the routes mentioned in Chapter-3	
18	Unit rate analysis of each SOR item with break-up of taxes/duties as per proforma attached as Annexure- A and B of Chapter2	
19	Bill of Material (BOM) with prices of each module/cards etc. & Route wise breakup of BOM as per the routes mentioned in Chapter-3.	
20	Schedule of Requirements (SOR) with quantities but with prices blanked out (this will be a replica of price bid with prices blanked out) and detailed unpriced Bill of Material including break up of common units/cards/backplane/Fan Tray unit etc. for building up the SOR items for supply. Route wise breakup of SOR & BOM.	
21	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	
22	Certificate of Local Content, if applicable as per clause 41.1 of Chapter-4A	
23	Annexure-VI: Certificate by bidders sharing a land boarder with India as per clause 41.2 of Chapter-4A	
24	Certificate of MSME, if applicable as per clause 23 of Chapter-4A	

Detail of Offered equipment's against SOR:

SN	SOR Item no.	Item Description	Make	Model	Data Sheet Placed at Page No. of Bid
1					
2					
3					
4					

DETAILS OF CREDENTIALS SUBMITTED AGAINST ELIGIBILITY CRITERIA OF OEM

SN	Clause	Supporting documents	Details/R emarks	Page no of the Bid
----	--------	----------------------	------------------	--------------------

1				
2				
3				

DETAILS OF CREDENTIALS SUBMITTED AGAINST ELIGIBILITY CRITERIA OF BIDDER:

SN	Clause	Supporting documents	Details/R emarks	Page no of the Bid
1				
2				
3				
4				
5				

Note: Non submission/ non-compliance of above documents as deliberated in Check List will make the offer liable to be rejected.

Manufacturer Authorisation form (MAF)

Executive Director
RailTel Corporation of India Limited,
Plate-A, 6th Floor, Office Tower-2,
NBCC Building, East Kidwai Nagar,
New Delhi-110023

Dated:_____

Subject: Manufacturer Authorisation form (MAF) to M/s for

Ref: Tender No.....dated.....

Dear Sir,

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

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

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

Thanking you,
Best regards,

Authorised Signatory

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RAILTEL

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.**

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 ED/RGM/RailTel/----- 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. _____ 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 (RGM)/Executive Director (ED) ----- 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/ED/RailTel/-----Region, or his authorized nominee and the said assessments shall be final and binding upon us.

Dated this _____ day of _____, 2020

for and on behalf of M/s _____ (Contractor)

Signature of witness
Name and witness in Block letters
Address

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Form No. 8**AFFIDAVIT**

(To be given separately by each Consortium/Joint Venture Member of the Bidder on Stamp Paper of appropriate value)

I, _____ S/o _____, Resident of _____, the _____ [insert designation] of the [insert name of single bidder / Consortium/Joint Venture member if Consortium/Joint Venture] do solemnly affirm and state as follows:

1. I say that I am the authorized signatory of _____ [insert name of Company/Consortium/Joint Venture member] (hereinafter referred to as "Bidder/Consortium/Joint Venture Member") and I am duly authorized by the Board of Directors of the Bidder/Consortium/Joint Venture Member to swear and depose this Affidavit on behalf of the Bidder/Consortium/Joint Venture Member.
2. I say that I have submitted information with respect to our eligibility for RailTel Corporation of India Ltd. (hereinafter referred to as "RailTel") (**NAME OF WORK**) (hereinafter referred to as "Project") Request for Proposal ('RFP') document and I further state that all the said information submitted by us is accurate, true and correct and is based on our records available with us.
3. I say that, we hereby also authorize and request any bank, authority, person or firm to furnish any information, which may be requested by RailTel to verify our credentials / information provided by us under this tender and as may be deemed necessary by RailTel.
4. I say that if at any point of time including the extension period, in case RailTel requests any further/additional information regarding our financial and/or technical capabilities, or any other relevant information, we shall promptly and immediately make available such information accurately and correctly to the satisfaction of RailTel.
5. I say that, we fully acknowledge and understand that furnishing of any false or misleading information by us in our RFP shall entitle us to be disqualified from the tendering process for the said Project. The costs and risks for such disqualification shall be entirely borne by us.
6. I state that all the terms and conditions of the Request for Proposal (RFP) document has been duly complied with.

DEPONENT**VERIFICATION**

I, the above-named deponent, do verify that the contents of paragraphs 1 to 6 of this affidavit are true and correct to my own knowledge. No part of it is false and nothing material has been concealed. Verified at _____, on this _____ day of _____, 2020.

DEPONENT

CONSORTIUM AGREEMENT /MEMORANDUM OF AGREEMENT

(On Stamp Paper of appropriate
value)

This Consortium Agreement is executed at _____ on this _____ day of _____, 2020.

BETWEEN

M/s. _____, a Company incorporated under the Companies Act, 1956 and having its Registered Office at _____ acting through its Managing Director, _____ duly authorized by a resolution of the Board of Directors dated _____ (hereinafter referred to as the 'LEAD MEMBER' which expression unless excluded by or repugnant to the subject or context be deemed to mean and include its successors in interest, legal representatives, administrators, nominees and assigns) of the ONE Part;

AND

M/s. _____, a Company having its Office at _____ and Office at _____, acting through its Joint President/ MD/..., _____, duly authorized by a resolution of the Board of Directors dated _____ (hereinafter referred to as the ('Participant member') which expression unless excluded by or repugnant to the subject or context be deemed to mean and include its successors in interest, legal representatives, administrators, nominees and assigns) of the OTHER PART'

AND

M/s. _____, a Company having its Office at _____ and Office at _____, acting through its Joint President/ MD/..., _____, duly authorized by a resolution of the Board of Directors dated _____ (hereinafter referred to as the ('Participant member') which expression unless excluded by or repugnant to the subject or context be deemed to mean and include its successors in interest, legal representatives, administrators, nominees and assigns) of the OTHER PART'

Whereas RailTel Corporation of India Ltd. (hereinafter referred to as 'RailTel') has invited tenders for the "(NAME OF WORK)" in terms of the tender documents issued for the said purpose and the eligibility conditions required that the applicants bidding for the same should meet the conditions stipulated by RailTel for participating in the bid by the Consortium for handling the project for which the tender has been floated by RailTel.

AND WHEREAS in terms of the bid documents the parties jointly satisfy the eligibility criteria laid down for a bidder for participating in the bid process by forming a Consortium between themselves.

AND WHEREAS the parties hereto have discussed and agreed to form a Consortium for participating in the aforesaid bid and have decided to reduce the agreed terms to writing.

NOW THIS CONSORTIUM Agreement hereby WITNESSES:

1. That in the premises contained herein the Lead Member and the Participant Member having decided to pool their technical know-how, working experiences and financial resources, have formed themselves into a Consortium to participate in the tender process for “(**NAME OF WORK**)” in terms of the tender invited by RailTel Corporation of India Ltd. (RailTel).
2. That the members of the Consortium have represented and assured each other that they shall abide by and be bound by the terms and conditions stipulated by RailTel for awarding the tender to the Consortium so that the Consortium may take up the aforesaid “(**NAME OF WORK**)” in case the Consortium turns out to be the successful bidder in the bid being invited by RailTel for the said purpose.
3. That the members of the Consortium have satisfied themselves that by pooling their technical know-how and technical and financial resources, the Consortium fulfills the prequalification/ eligibility criteria stipulated for a bidder, to participate in the bid for the said tender process for “(**NAME OF WORK**)”
4. That the Consortium have agreed to nominate any one of _____, _____ and _____ as the common representative who shall be authorized to represent the Consortium for all intents and purposes for dealing with the Government and for submitting the bid as well as doing all other acts and things necessary for submission of bid documents such as Tender Application Form etc., Mandatory Information, Financial Bid. Etc. and such other documents as may be necessary for this purpose.
5. That if any change in the membership of the Consortium be required to be made by the members of the Consortium, the same shall be done with the consent of RailTel subject to the conditions as may be stipulated by them in this regard.
6. That in case to meet the requirements of bid documents or any other stipulations of RailTel, it becomes necessary to execute and record any other documents amongst the members of the Consortium, they undertake to do the needful and to participate in the same for the purpose of the said project.
7. That it is clarified by and between the members of the Consortium that execution to this Consortium Agreement by the members of the Consortium does not constitute any type of partnership for the purposes of provisions of the Indian Partnership Act and that the members of the Consortium shall otherwise be free to carry on their independent business or commercial activities for their own respective benefits under their own respective names and styles. This Consortium Agreement is limited in its operation to the specified project.
8. That the Members of the Consortium undertake to specify their respective roles and responsibilities for the purposes of implementation of this Consortium Agreement and the said project, if awarded to the Consortium, to meet the requirements and stipulations of RailTel.
9. The consortium formed will not be subject to alteration with regard to change in constituting firms and/or reorientation of roles. Any changes, if proposed by Consortium to take advantage of certain developments during evaluation stage will render the bid liable to be rejected.

10. All partners of the consortium shall be jointly and severally liable to RailTel for the execution of the entire contract in accordance with its terms.
11. Each Consortium member has minimum 20% contribution in the work and role /scope of each member is enclosed.
12. Power of Attorney by all members of the Consortium in favor of the Lead Member is also enclosed.

IN FAITH AND TESTIMONY WHEREOF, THE PARTIES HERETO HAVE SIGNED THESE PRESENTS OF THE DATE, MONTH AND YEAR FIRST ABOVE WRITTEN.

1. (_____) Managing Director	2. (_____) Managing Director	3. (_____) Managing Director
(_____) For (Name of company)	(_____) For (Name of company)	(_____) For (Name of company)

WITNESSES:

1. _____
2. _____

Enclosure:

Board resolution of each of the Consortium Members authorizing:

- (i) Execution of the Consortium Agreement, and
- (ii) Appointing the authorized signatory for such purpose.

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Form No. 10

JOINT VENTURE AGREEMENT/MEMORANDUM OF AGREEMENT

(On Stamp Paper of appropriate value)

This Joint Venture Agreement/Memorandum of Agreement is executed at _____ on this day of _____, 2020.

BETWEEN

M/s _____, a company incorporated under the Companies Act, 1956 and having its Registered Office at _____ acting through its Managing Director, _____ duly authorized by a resolution of the Board of Directors dated _____ (hereinafter referred to as the 'LEAD MEMBER' which expression unless executed by or repugnant to the subject or context be deemed to mean and include its successors in interest, legal representatives, administrations, nominees and assigns) of the ONE Part;

AND

M/s. _____, a Company incorporated under the Companies Act, 1956 and having its Registered Office at _____ and office at _____, acting through its Joint President, _____, duly authorized by a resolution of the Board of Directors dated _____ (hereinafter referred to as the ('Participant member') which expression unless excluded by or repugnant to the subject or context be deemed to mean and include its successors in interest, legal representatives, administrators, nominees and assigns) of the OTHER PART'

AND

M/s. _____, a Company incorporated under the Companies Act, 1956 and having its Registered Office at _____ and Office at _____, acting through its Joint President, _____, duly authorized by a resolution of the Board of Directors dated _____ (hereinafter referred to as the ('Participant member') which expression unless excluded by or repugnant to the subject or context be deemed to mean and include its successors in interest, legal representatives, administrators, nominees and assigns) of the OTHER PART'

Whereas RailTel Corporation of India Ltd. (hereinafter referred to as 'RailTel') has invited tenders for the "**(NAME OF WORK)**" in terms of the tender documents issued for the said purpose and the eligibility conditions required that the applicants bidding for the same should meet the conditions stipulated by RailTel for participating in the bid by the Joint Venture for handling the project for which the tender has been floated by RailTel.

AND WHEREAS in terms of the bid documents the parties jointly satisfy the eligibility criteria laid down for a bidder for participating in the bid process by forming a Joint Venture between themselves.

AND WHEREAS the parties hereto have discussed and agreed to form a Joint Venture for participating in the aforesaid bid and have decided to reduce the agreed terms to writing.

NOW THIS JOINT VENTURE AGREEMENT/Memorandum of Agreement hereby
WITNESSES:

1. That in the premises contained herein the Lead Member and the ParticipantMember having decided to pool their technical know-how, working experiences and financial resources, have formed themselves into a Joint Venture to participate in the tender process for “(NAME OF WORK)” in terms of the tender invited by RailTel Corporation of India Ltd. (RailTel).
2. That the members of the Joint Venture have represented and assured each other that they shall abide by and be bound by the terms and conditions stipulated by RailTel for awarding the tender to the Joint Venture so that the Joint Venture may take up the aforesaid “(NAME OF WORK)” in case the Joint Venture turns out to be the successful bidder in the bid being invited by RailTel for the said purpose.
3. That the members of the Joint Venture have satisfied themselves that by pooling their technical know-how and technical and financial resources, the Joint Venture fulfills the prequalification/ eligibility criteria stipulated for a bidder, to participate in the bid for the said tender process for “(NAME OF WORK)”
4. That the Joint Venture have agreed to nominate any one of _____, _____ and _____ as the common representative who shall be authorized to represent the Joint Venture for all intents and purposes for dealing with the Government and for submitting the bid as well as doing all other acts and things necessary for submission of bid documents such as Tender Application Form etc., Mandatory Information, Financial Bid. Etc. and such other documents as may be necessary for this purpose.
5. That the share holding of the members of the Joint Venture for this specified purpose shall be as follows:
 - (i) The Lead Member shall have _____ per cent (____%) of share holding/participation with reference to the Joint Venture for this specified project.
 - (ii) The Participant Member shall have _____ per cent (____%) of share holding/participation with reference to the Joint Venture for this specified project.
 - (iii) The Participant Member shall have _____ per cent (____%) of share holding/participation with reference to the Joint Venture for this specified project.
6. That in order to fulfill the requirement of the tender process and also keep an altogether separate legal entity of the Joint Venture, the Members of the Joint Venture undertake to provide their own nominees as share holders to the extent of their respective share holding for the purpose of formation of a Special Purpose Company (SPC) through which the Joint Venture proposes to undertake the _____ of RailTel.
7. That if any change in the membership of the Joint Venture be required to be made by the members of the Joint Venture, the same shall be done with the consent of RailTel subject to the conditions as may be stipulated by them in this regard.
8. That in case to meet the requirements of bid documents or any other stipulations of RailTel, it becomes necessary to execute and record any other documents amongst the members of the Joint Venture, they undertake to do the needful and to participate in the same for the

purpose of the said project.

9. That it is clarified by and between the members of the Joint Venture that execution to this Joint Venture Agreement/Memorandum of Agreement by the members of the Joint Venture does not constitute any type of partnership for the purposes of provisions of the Indian Partnership Act and that the members of the Joint Venture shall otherwise be free to carry on their independent business or commercial activities for their own respective benefits under their own respective names and styles. This Joint Venture Agreement is limited in its operation to the specified project.
10. That the Members of the Joint Venture undertake to specify their respective roles and responsibilities for the purposes of implementation of this Joint Venture Agreement and the said project if awarded to the Joint Venture in the Memorandum & Articles of Association of the proposed Special Purpose Company to be got incorporated by the Joint Venture Members to meet the requirements and stipulations of RailTel.

IN FAITH AND TESTIMONY WHEREOF, THE PARTIES HERETO HAVE SIGNED THESE PRESENTS OF THE DATE, MONTH AND YEAR FIRST ABOVE WRITTEN.

1. (_____) Managing Director	2. (_____) Managing Director	3. (_____) Managing Director
(_____) For (Name of company)	(_____) For (Name of company)	(_____) For (Name of company)

WITNESSES:

1. _____
2. _____

Enclosure:

- Board resolution of each of the Joint Venture Members authorizing:
- (i) Execution of the Joint Venture Agreement, and
 - (ii) Appointing the authorized signatory for such purpose.

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PROFORMA FOR SIGNING THE INTEGRITY PACT
(On Stamp Paper of appropriate value)

RailTel Corporation of India Limited, hereinafter referred to as “The Principal”.

And

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

Preamble

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

.....The Principal values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relations with its Bidder(s) and /or Contractor(s).

In order to achieve these goals, the Principal will appoint an Independent External Monitor (IEM), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1- Commitments of the Principal

1. The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-
 - a. No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - b. The Principal will during the tender process treat all Bidder(s) with equity and reason.

The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the process or the contract execution.
 - c. The Principal will exclude from the process all known prejudiced persons.
2. If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC/PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section 2- Commitments of the Bidder(s) /Contractor(s)

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

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

If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2, above or in any other form such as to

put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or take action as per the procedure mentioned in the “Guidelines on Banning of business dealings”. Copy of the “Guidelines on Banning of business dealings” is annexed and marked as Annex-“B”.

Section 4: Compensation for Damages

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

Section 5: Previous Transgression

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

Section 6: Equal treatment of all Bidders/ Contractors/Subcontractors.

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

Section 7: Criminal charges against violation by Bidder(s) / Contractor(s) / Sub contractor(s)

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

Section 8: Independent External Monitor / Monitors

1. The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
2. The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, RailTel.
3. The Bidder(s)/Contractor(s) accepts that the Monitor has the right to access without restriction to all project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/Subcontractor(s) with confidentiality.
4. The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
5. As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
6. The Monitor will submit a written report to the CMD, RailTel within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
7. Monitor shall be entitled to compensation on the same terms as being extended to provided to Independent Directors on the RailTel Board.
8. If the Monitor has reported to the CMD, RailTel, a substantiated suspicion of an offence under relevant IPC/PC Act, and the CMD, RailTel has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.
9. The word 'Monitor' would include both singular and plural.

Section 9: Pact Duration

This pact begins when both parties have legally signed it. It expires for the Contractor 10 months after the last payment under the contract, and for all other Bidders 6 months after the contract has been awarded.

If any claim is made / lodged by either party during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged / determined by CMD of RailTel.

Section 10: Other Provisions

1. This agreement is subject to Indian Law, Place of performance and jurisdiction is the Registered Office of the Principal, i.e. New Delhi.
2. Changes and supplements as well as termination notices need to be made in writing.
3. If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
4. Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(For & On behalf of the Principal)
(Office Seal)

Place _____

Date _____

(For & On behalf of Bidder/Contractor)
(Office Seal)

Place _____

Date _____

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Witness 1:

(Name & Address)

Witness 2:

(Name & Address)

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FORM No. 12

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

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

I.....(Name and designation)** appointed as the attorney/authorized signatory of the tenderer (including its constituents),

M/s. _____ (hereinafter called the tenderer) for the purpose of the Tender documents for the work of _____ as per the tender No. _____ of RailTel, do hereby solemnly affirm and state on the behalf of the tenderer including its constituents as under:

1. I/We the tenderer (s), am/are signing this document after carefully reading the contents.
2. I/we the tenderer(s) also accept all the conditions of the tender and have signed all the pages in confirmation thereof.
3. I/We hereby declare that I/We have downloaded the tender documents from electronic tender portal. I/We have verified the content of the document from the website and there is no addition, no deletion or no alteration to the content of the tender document. In case of any discrepancy noticed at any stage i.e. evaluation of tenderers, execution of work or final payment of the contract, the master copy available with the RailTel Administration shall be final and binding upon me/us.
4. I/We declare and certify that I/we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
5. I/We also understand that my/our offer will be evaluated based on the documents/credentials submitted alongwith the offer and same shall be binding upon me/us.
6. I/We declare that the information and documents submitted alongwith the tender by me/us are correct and I/we are fully responsible for the correctness of the information and documents submitted by us.
7. I/We undersigned that if the certificates regarding eligibility criteria submitted by us are found to be forged/false or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender EMD besides banning of business for five years in RailTel. Further, I/we (insert name of the tenderer)** _____ and all my/our constituents understand that my/our offer shall be summarily rejected.
8. I/we also understand that if the certificates submitted by us are found to be false/forged or incorrect at any time after the award of the contract, it will lead to termination of the contract, alongwith forfeiture of EMD/SD and Performance Guarantee besides any other action provided in the contract including banning of business for five years in RailTel.

**DEPONENT
SEAL AND SIGNATURE
OF THE TENDERER**

VERIFICATION

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

**DEPONENT
SEAL AND SIGNATURE
OF THE TENDERER**

Place:

Dated:

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

(End of Chapter- 6)

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CHAPTER-7

Detailed standard conditions applicable for the Annual Maintenance Contract

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 and Corporate office at Plate-A, 6th Floor, Office Tower-2, NBCC Building, East Kidwai Nagar, New Delhi-110023.

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:

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 the equipments shall fill up the history sheet containing the statistics about the health of the 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 Repair and Return Services

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.

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:

- Alarm monitoring at the network management platform
Equipment alarms
Transmission alarms
PM Threshold alarms
- 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 30 days from the date of issue of LOA for AMC @ 10% of the total AMC cost of five years valid for a period 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 Regional General Managers/ 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 Regional Managers/ 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 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, notwithstanding 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 monetary 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.

7.10.1 **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.

7.10.2 **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 contract (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.

7.10.3 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.

7.10.4 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.

7.10.5 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-4A 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 notwithstanding 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.

(End of Chapter- 7)

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RAILTEL

CHAPTER- 8A

DWDM and MDWDM Technical Specifications

1.0 RailTel Solution Requirements:

The System Configurations of DWDM and MDWDM Equipments are described in chapter 3(A). 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 chassis at OADM sites shall support minimum 8x100G client-side capacity from day-one.
- 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/Muxponders 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, OTU1 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 pluggable/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.
- 1.3.2.8 100/200G Transponder shall support OTU4 and OTUC2 DWDM line rate in pluggable/fixed module.

1.4 Pluggable Optics

- 1.4.1.1 System shall support SFP with following client side services & specified reach 10G on Muxponder:
- 1.4.1.2 STM-1/OC-3 (IR-1, 1310 nm, SM)
- 1.4.1.3 STM-1/OC-3 (LR-1, 1310 nm, SM)
- 1.4.1.4 STM-1/OC-3 Electrical
- 1.4.1.5 STM-4/OC-12 (IR-1, 1310 nm, SM)
- 1.4.1.6 STM-4/OC-12 (LR-1, 1310 nm, SM)
- 1.4.1.7 STM-16/OC-48 (SR-1, 1310 nm, SM)

- 1.4.1.8 STM-16/OC-48 (IR-1, 1310 nm, SM)
- 1.4.1.9 STM-16/OC-48 (LR-1, 1310 nm, SM)
- 1.4.1.10 STM-16/OC-48 (LR-2, 1550 nm, SM)
- 1.4.1.11 STM-16/OC-48 (IR-2, 14xx/15xx/16xx nm CWDM, SM)
- 1.4.1.12 GE (SR/SX, 850 nm, MM)
- 1.4.1.13 GE (LX, 1310 nm, SM)
- 1.4.1.14 GE (ZX, 1550 nm, 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 (1310 nm Optical SDI)
- 1.4.1.33 3G-SDI (3G-SDI Optical Video)
- 1.4.1.34 1000Base-BX (single mode, single fiber, 10 km, 1310TX / 1490RX)
- 1.4.1.35 1000Base-BX (single mode, single fiber, 10 km, 1490TX / 1310RX)
- 1.4.1.36 OTU1 (SR-1, 1310 nm, SM)
- 1.4.1.37 OTU1 (IR-1, 1310 nm, SM)
- 1.4.1.38 OTU1 (LR-1, 1310 nm, SM)
- 1.4.1.39 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, SM)
- 1.4.2.7 10GbE (ER/EW, 1550nm, SM)
- 1.4.2.8 10GbE (ZR/ZW, 1550nm, SM)
- 1.4.2.9 8G FC (SR/SW, 850nm, MM)
- 1.4.2.10 8G FC (LR/LW, 1310nm, SM)
- 1.4.2.11 8G FC (ER/EW, 1550nm, SM)
- 1.4.2.12 8G FC (ZR/ZW, 1550nm, SM)
- 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 Deleted.

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 with/without guard bands.

3.0 Deleted

3.1 Product Quality

- 3.1.1 Product shall be designed for a minimum lifetime of 10 years..
- 3.1.2 Equipment shall support non traffic affecting upgrade between subsequent product releases.
- 3.1.3 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

The product shall be compliant to:

- 3.2.1 Product shall be compliant to RoHS (Restriction of certain Hazardous Substances) requirements:
- 3.2.2 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 /ANSI relay 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 or Environmental Telcordia NEBS GR-63-CORE
- 3.4.4 Operation: ETS300 019 Class 3.1 or ETS 300 019-2-3 (Operational, Class 3.1E).
- 3.4.5 Transport: ETS300 019 Class 2.2 or ETS 300 019-2-2 (Transportation, Class 2.3)
- 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 or EN 300 386: 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 10⁹ 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 3x24h 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

- 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) OR OTN frame overhead (GCC0, GCC1, and GCC2 channel).

4.7 DWDM Coloured 10G SFP+

1	Should be compatible with OEM equipment's like Cisco, Juniper, D Link, Edge Core, Tejas and Fibcom.
2	Should support 80 km optical distance on direct fiber and 150 KM with optical fiber distance (losses 0.5db/km) on MDWDM Network (amplified application).
3	should support ITU Grid Channels (DWDM) as per DWDM channel matrix requirement. Bidder should supply fixed wavelength SFPs as per channel requirement.
4	Should have LC type connector.
5	Should have 10 Gigabit Ethernet capacity on single mode fiber.
6	Should support DDMI feature.
7	OEM Should be having valid ISO 9000 & ISO 14000 certification on the date of opening of bid.
8	Should have CE/FCC and UL regulatory compliances.
9	Operating Temperature of the SFP Should be mini 0 to 65 °C (23 to 149 °F)
10	Should support link budget of 22db (Link budget will be measure on 1550 nm wavelength)

Note : Bidder can also propose 10G transponder instead of DWDM 10G SFP+ as per specifications given in clause 1.3. In that case, Transponder should have minimum line/client-side ports as per traffic matrix requirement. Clients side should be equipped with 10G SFP+/XFP (1310nm).

(End of Chapter- 8A)

CHAPTER- 8B

(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 grouting and equipped with 4 leveling screws & grouting 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 Acrylic 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)



Annexure-I

1. Bangalore-Mumbai & Bangalore-Chennai

SN	END A	Node Type	END B	Node Type	Fiber Length (in Km)	Fiber Type (G652D or not)	1 st Fiber Loss (in dBm)	2 nd Fiber Loss (in dBm)
1	Panvel	OADM	Lonavala	ILA	62	Yes	18	18
2	Lonavala	ILA	Pune	OADM	70	Yes	32	32
3	Pune	OADM	Jejuri	ILA	63.4	Yes	28	28
4	Jejuri	ILA	Nira	ILA	28.3	Yes	14	14
5	Nira	ILA	Satara	ILA	65	Yes	23	23
6	Satara	ILA	Karad	ILA	62	Yes	21	21
7	Karad	ILA	Sangli	ILA	71	Yes	35	35
8	Sangli	ILA	Miraj	OADM	8.5	Yes	2.2	2.2
9	Miraj	OADM	Kudachi	ILA	36.3	Yes	16	16
10	Kudachi	ILA	Ghataprabha	ILA	51.4	Yes	20	20
11	Ghataprabha	ILA	Belgaon	ILA	64.8	Yes	26	26
12	Belgaon	ILA	Londa	OADM	57.5	Yes	27.4	29
13	Panvel	OADM	Roha	ILA	85	Yes	21	21
14	Roha	ILA	Mangaon	ILA	45	Yes	25	25
15	Mangaon	ILA	Veer	ILA	27	Yes	20	20
16	Veer	ILA	Karjanwadi	ILA	29	Yes	24	24
17	Karjanwadi	ILA	Khed	ILA	50	Yes	20	20
18	Khed	ILA	Chiplaun	ILA	42	Yes	16	16
19	Chiplaun	ILA	Savarda	ILA	28	Yes	22	22
20	Savarda	ILA	Sangameshwar	ILA	37	Yes	15	15
21	Sangameshwar	ILA	Ratnagiri	ILA	46	Yes	20	20
22	Ratnagiri	ILA	Adava	ILA	35	Yes	22	22
23	Adava	ILA	Vilvade	ILA	21	Yes	18	18
24	Vilvade	ILA	Vaibhawadi	ILA	36	Yes	20	20
25	Vaibhawadi	ILA	Kudal	ILA	35	Yes	20	20
26	Kudal	ILA	Sawantwadi	ILA	25	Yes	19	19
27	Sawantwadi	ILA	Thivem	ILA	34	Yes	16	16
28	Thivem	ILA	Karmali	ILA	22	Yes	15	15
29	Karmali	ILA	Madgaon	ILA	31.5	Yes	23	23
30	Madgaon	OADM	Castlerock	ILA	67.7	Yes	19	23.5
31	Castlerock	ILA	Londa	OADM	28	Yes	10.3	11.5
32	Londa	OADM	Alnawar	ILA	37.5	Yes	17.1	22.2
33	Alnawar	ILA	Hubli	OADM	65	Yes	29.7	31.8
34	Hubli	OADM	Haveri	ILA	82.3	Yes	28	29
35	Haveri	ILA	Davangere	ILA	75.6	Yes	20.9	23.5
36	Davangere	ILA	Chikjajur	ILA	49	Yes	12	12
37	Chikjajur	ILA	Birur	ILA	78.8	Yes	28	28
38	Birur	ILA	Arsikere	OADM	45	Yes	19.1	19.1
39	Arsikere	OADM	Tiptur	ILA	25	Yes	10.8	12.8
40	Tiptur	ILA	Tumkur	ILA	78.6	Yes	30.6	27.9
41	Tumkur	ILA	Dodbele	ILA	37.7	Yes	24.4	27.7

42	Dodbele	ILA	Bangalore	OADM	43.4	Yes	31	28.9
43	Madgaon	OADM	Cancona	ILA	30.8	Yes	26.8	26.8
44	Cancona	ILA	Karwan	ILA	29.756	Yes	23.4	23.4
45	Karwan	ILA	Ankola	ILA	30.471	Yes	23	23
46	Ankola	ILA	Kumta	ILA	28.499	Yes	22	22
47	Kumta	ILA	Murudeshwar	ILA	34.03	Yes	26.3	26.3
48	Murudeshwar	ILA	Bhatkal	ILA	15.4	Yes	15.2	15.2
49	Bhatkal	ILA	Senapura	ILA	37.14	Yes	32	32
50	Senapura	ILA	Kundapura	ILA	14.6	Yes	14.5	14.5
51	Kundapura	ILA	Udupi	ILA	33.18	Yes	24.6	24.6
52	Udupi	ILA	Suratkal	ILA	44.15	Yes	33.4	33.4
53	Suratkal	ILA	MAQ (Manglore)	OADM	32.8	Yes	21.2	21.2
54	MAQ (Manglore)	OADM	Kabakputtur	ILA	56.1	Yes	24.1	17.6
55	Kabakputtur	ILA	Sub-RD	ILA	47.57	Yes	16.1	16.4
56	Sub-RD	ILA	Saklespur	ILA	65	Yes	20	16.2
57	Saklespur	ILA	Hassan	OADM	50	Yes	21	22
58	Hassan	OADM	CNPA	ILA	38	Yes	12	12
59	CNPA	ILA	KIGL	ILA	83	Yes	22	22
60	KIGL	ILA	Bangalore	OADM	80	Yes	29	29
61	Hassan	OADM	Arsikere	OADM	47	Yes	28	28
62	Bangalore	OADM	Hosur	ILA	53.6	Yes	16.33	17.8
63	Hosur	ILA	Dharamapuri	ILA	100.6	Yes	25.9	26.7
64	Dharamapuri	ILA	Salem	ILA	75.8	Yes	27.3	28.6
65	Salem	ILA	Erode	OADM	75.2	Yes	24.5	24.5
66	Erode	OADM	Karur	ILA	76.8	Yes	25.7	25.7
67	Karur	ILA	Trichi	OADM	90.1	Yes	37	38.7
68	Trichi	OADM	Ariyalur	ILA	80.9	Yes	35.7	34.5
69	Ariyalur	ILA	Virudhachalam	ILA	61.2	Yes	30.4	29.4
70	Virudhachalam	ILA	Villipuram	ILA	62.4	Yes	27	27
71	Villipuram	ILA	Tindivaram	ILA	61	Yes	27	27
72	Tindivaram	ILA	Chengalpattu	ILA	76.3	Yes	23.2	28.4
73	Chengalpattu	ILA	Tambaram	ILA	37.2	Yes	23.1	23.9
74	Tambaram	ILA	Chennai	OADM	30.6	Yes	14.9	14.5
75	Hubli	OADM	Gadag	ILA	65	Yes	24	24
76	Gadag	ILA	Koppal	ILA	65	Yes	26	26
77	Koppal	ILA	Hospet	ILA	32	Yes	18	18
78	Hospet	ILA	Bellary	ILA	75	Yes	31.1	31.3
79	Bellary	ILA	Guntakal	OADM	57.5	Yes	19	18.9

2. Delhi to Kolkata

SN	END A	Node Type	END B	Node Type	Fiber Length (in Km)	Fiber Type (G652D or not)	1 st Fiber Loss (in dBm)	2 nd Fiber Loss (in dBm)
1	NDLS	OADM	NIC-SP	OADM	8.7	G652D	26.8	26.8
2	NIC-SP	OADM	Ghaziabad	OADM	20	G652D	32.8	32.8
3	Ghaziabad	OADM	Khurja	ILA	69.45	G652D	32.1	32.1
4	Khurja	ILA	Aligargh	ILA	49.22	G652D	24.3	24.3
5	Aligargh	ILA	Pora	ILA	46	G652D	24.9	24.9
6	Pora	ILA	Tundla	OADM	43.26	G652D	20.7	20.7
7	Tundla	OADM	Sikohabad	ILA	43.53	G652D	23.1	23.1
8	Sikohabad	ILA	Etawa	ILA	61	G652D	28	28
9	Etawa	ILA	Phaphund	ILA	58	G652D	28.1	28.1
10	Phaphund	ILA	Rura	ILA	58	G652D	22.8	22.8
11	Rura	ILA	Kanpur	OADM	45	G652D	25.1	25.1
12	Ghaziabad	OADM	Hapur	ILA	41.9	G652D	25.5	25.5
13	Hapur	ILA	Gajrola	ILA	54.8	G652D	23.7	23.7
14	Gajrola	ILA	Moradabaad	ILA	58.5	G652D	28	28
15	Moradabaad	ILA	Rampur	ILA	32	G652D	18.7	18.7
16	Rampur	ILA	Bareilly	ILA	70	G652D	32	32
17	Bareilly	ILA	Shajahanpur	ILA	80	G652D	33.9	33.9
18	Shajahanpur	ILA	Hardoi	ILA	69	G652D	29.1	29.1
19	Hardoi	ILA	Balamau	ILA	35	G652D	14.7	14.7
20	Balamau	ILA	Lucknow	OADM	82	G652D	35.6	35.6
21	Lucknow	OADM	Ajgain	ILA	45	G652D	23.1	23.1
22	Ajgain	ILA	Kanpur	OADM	39	G652D	19.6	19.6
23	Kanpur	OADM	Aung	ILA	43.7	G652D	29	29
24	Aung	ILA	Fatehpur	ILA	39.8	G652D	23.2	23.2
25	Fatehpur	ILA	Katoghan	ILA	43.1	G652D	25.7	25.7
26	Katoghan	ILA	Bharwari	ILA	42.2	G652D	23.8	23.8
27	Bharwari	ILA	Allahabad	OADM	43.1	G652D	23.1	23.1
28	Allahabad	OADM	Mejaroad	ILA	42.16	G652D	23.1	23.1
29	Mejaroad	ILA	Vindhyachal	ILA	46	G652D	26.9	26.9
30	Vindhyachal	ILA	Chunar	ILA	43.2	G652D	21.8	21.8
31	Chunar	ILA	Mugalsarai	OADM	37	G652D	24.9	24.9
32	Lucknow	OADM	Raibarali	ILA	77	G652D	22	22
33	Raibarali	ILA	Gauriganj	ILA	51	G652D	20	20
34	Guriganj	ILA	Pratapgarh	ILA	52	G652D	23	23
35	Pratapgarh	ILA	Janghai	ILA	59	G652D	30	30
36	Janghai	ILA	BHADOHI	ILA	33	G652D	18	18
37	BHADOHI	ILA	Varanasi	ILA	48	G652D	24	24
38	Varanasi	ILA	Mugalsarai	OADM	22.4	G652D	13.4	13.4
39	Mugalsarai	OADM	Babua Road	ILA	61.572	G652D	26.2	28.2
40	Babua Road	ILA	Sasaram	ILA	52.362	G.652	22.93	22.93

41	Sasaram	ILA	Rafiganj	ILA	67.8	G.652	23.73	23.73
42	Gaya	ILA	Rafiganj	ILA	45	G.653	18	18
43	Gaya	ILA	Paharpur	ILA	38.23	G.652	19.12	19.12
44	Paharpur	ILA	Koderma	ILA	53.518	G.652	32.91	32.91
45	Koderma	ILA	Parasnath	ILA	83.8	G.652	32.35	32.35
46	Parasnath	ILA	Dhanbad	ILA	54.539	G.652	22.91	22.91
47	Dhanbad	ILA	Asansol	OADM	69.532	G.653	29.20	29.20
48	Mugalsarai	OADM	Zamania	ILA	48.359	G.652	20.31	20.31
49	Zamania	ILA	Buxar	ILA	52.933	G.652	22.23	22.23
50	Buxar	ILA	ARA	ILA	74.651	G.652	31.35	31.35
51	ARA	ILA	Patna	ILA	57.304	G.652	24.07	24.07
52	Patna	ILA	Bhaktiyarpur	ILA	49.9	G.652	20.96	20.96
53	Bhaktiyarpur	ILA	Mokama	ILA	50.86	G.652	21.36	21.36
54	Mokama	ILA	Kiul	ILA	39.015	G.652	16.39	16.39
55	Kiul	ILA	Jhajha	ILA	59.26	G.652	22.62	22.62
56	Jhajha	ILA	Jasidih	ILA	49.54	G.652	18.53	18.53
57	Jasidih	ILA	Madhupur	ILA	31.12	G.652	14.32	14.32
58	Madhupur	ILA	Asansol	OADM	90.51	G.653	35	35
59	Allahabad	OADM	Shankargarh	ILA	48.6	G652D	24	24
60	Shankargarh	ILA	Manikpur	ILA	60.6	G652D	24.7	24.7
61	Manikpur	ILA	Satna	ILA	83	G652D	22	22
62	Satna	ILA	Maihar	ILA	39	G652D	13	13
63	Maihar	ILA	Katni	OADM	67	G652D	19	19
64	NDLS	OADM	Ghaziabad	OADM	30	G652D	30	30
65	Tundla	OADM	AGRA	OADM	40	G652D	31	31

3. Delhi to Mumbai

SN	END A	Node Type	END B	Node Type	Fiber Length (in Km)	Fiber Type (G652D or not)	1st Fiber Loss (in dBm)	2nd Fiber Loss (in dBm)
1	NDLS	OADM	Gurgaon	OADM	39.0	YES	31.7	31.7
2	Rewari	ILA	Gurgaon	OADM	57.5	YES	25.6	25.6
3	Rewari	ILA	Narnaul	ILA	58.8	YES	26.0	26.0
4	Narnaul	ILA	Nim Ka Thana	ILA	55.0	YES	22.0	22.0
5	Nim Ka Thana	ILA	Ringus	ILA	51.0	YES	20.0	20.0
6	Jaipur	OADM	Ringus	ILA	61.0	YES	18.0	18.0
7	Phulera	ILA	Jaipur	OADM	60.0	YES	15.0	15.0
8	Ajmer	ILA	Phulera	ILA	90.0	YES	24.0	24.0
9	Beawar	ILA	Ajmer	ILA	55.0	YES	15.0	15.0
10	Marwar	OADM	Chandawal	ILA	58.0	YES	25.5	25.5
11	Chandawal	ILA	Beawar	ILA	40.6	YES	20.0	20.0
12	Bhagwanpura	ILA	Marwar	OADM	73.0	YES	20.0	20.0
13	Sirohi Raod	ILA	Bhagwanpura	ILA	63.0	YES	18.0	18.0
14	Abu Road	ILA	Sirohi Raod	ILA	52.0	YES	16.0	16.0

15	Palanpur	ILA	Abu Road	ILA	56.0	YES	18.0	18.0
16	Mehsana	ILA	Palanpur	ILA	72.0	YES	22.0	22.0
17	Ahemdabad	OADM	Mehsana	ILA	75.0	YES	30.0	30.0
18	Anand	ILA	Ahemdabad	OADM	72.0	YES	35.0	35.0
19	Pratapnagar	OADM	Anand	ILA	50.0	YES	33.0	33.0
20	Palej	ILA	Pratapnagar	OADM	50.0	YES	35.0	35.0
21	Panoli	ILA	Palej	ILA	46.0	YES	30.0	30.0
22	Surat	OADM	Panoli	ILA	46.0	YES	28.0	28.0
23	Navsari	ILA	Surat	OADM	43.0	YES	25.0	25.0
24	Navsari	ILA	Valsad	ILA	33.0	YES	20.0	20.0
25	Bhilad	ILA	Valsad	ILA	41.0	YES	25.0	25.0
26	Boisar	ILA	Bhilad	ILA	65.0	YES	35.0	35.0
27	Vasai	OADM	Boisar	ILA	55.0	YES	32.0	32.0
28	Vasai	OADM	Mumbai	OADM	56.0	YES	36.0	36.0
29	NDLS	QADM	Okhla	OADM	11.0	YES	20.0	20.0
30	Okhla	OADM	Palwal	ILA	50.0	YES	24.0	24.0
31	Palwal	ILA	Kosi	ILA	48.8	YES	24.1	24.1
32	Kosi	ILA	Mathura	ILA	48.3	YES	27.8	27.8
33	Mathura	ILA	Agra	OADM	60.4	YES	29.6	29.6
34	Agra	OADM	Dholpur	ILA	58.2	YES	28.5	28.5
35	Dholpur	ILA	Gawalior	ILA	71.5	YES	29.3	29.3
36	Gawalior	ILA	Dabra	ILA	45.9	YES	26.9	26.9
37	Dabra	ILA	Jhansi	ILA	60.9	YES	27.3	27.3
38	Jhansi	ILA	Talbhat	ILA	56.4	YES	27.0	27.0
39	Talbhat	ILA	Lalitpur	ILA	43.8	YES	24.1	24.1
40	Lalitpur	ILA	Bina	OADM	68.1	YES	29.6	29.6
41	Bina	OADM	Ganjbasoda	ILA	51.7	YES	19.0	19.0
42	Ganjbasoda	ILA	Vidisha	ILA	43.0	YES	16.0	16.0
43	Vidisha	ILA	Bhopal	OADM	60.3	YES	21.0	21.0
44	Bhopal	OADM	Obdullaganj	ILA	42.0	YES	18.0	18.0
45	Obdullaganj	ILA	Itarsi	OADM	67.0	YES	24.0	24.0
46	Itarsi	OADM	Harda	ILA	79.9	YES	22.0	22.0
47	Harda	ILA	Channera	ILA	68.1	YES	20.7	20.7
48	Channera	ILA	Khandwa	ILA	48.2	YES	17.3	17.3
49	Khandwa	ILA	Burhanpur	ILA	74.3	YES	21.3	21.3
50	Burhanpur	ILA	Bhusawal	OADM	58.2	YES	18.8	18.8
51	Bhusawal	OADM	Jalgaon	ILA	27.6	YES	15.2	15.2
52	Jalgaon	ILA	Amalner	ILA	58.0	YES	28.0	28.0
53	Amalner	ILA	Nardana	ILA	30.0	YES	15.0	15.0
54	Naranda	ILA	Nandurbar	ILA	72.0	YES	35.0	35.0
55	Nandurbar	ILA	Navapur	ILA	60.0	YES	28.0	28.0
56	Navapur	ILA	Ukai_Songarh	ILA	30.0	YES	16.0	16.0
57	Ukai_Songarh	ILA	Madhi	ILA	40.0	YES	22.0	22.0
58	Madhi	ILA	Surat	OADM	50.0	YES	25.0	25.0
59	Jaipur	OADM	Siras	ILA	70.0	YES	20.0	20.0
60	Siras	ILA	Sawai Madhopur	OADM	70.0	YES	20.0	20.0
61	Sawai Madhopur	OADM	Laban	ILA	58.0	YES	25.0	25.0

62	Laban	ILA	Kota	OADM	60.0	YES	26.0	26.0
63	Kota	OADM	Baran	ILA	74.0	YES	29.0	29.0
64	Baran	ILA	Chhabra	ILA	63.0	YES	21.0	21.0
65	Chhabra	ILA	Guna	ILA	64.0	YES	26.0	26.0
66	Guna	ILA	Ashok Nagar	ILA	47.0	YES	18.0	18.0
67	Ashok Nagar	ILA	Bina	OADM	80.0	YES	30.0	30.0
68	Gangapur City	ILA	Sawai Madhopur	OADM	73.0	YES	31	32
69	Hindon	ILA	Gangapur City	ILA	50.0	YES	28	28.6
70	Bayana	ILA	Hindon	ILA	46.0	YES	24	24.4
71	Bayana	ILA	Fatehpur Sikri	ILA	50.0	YES	30	30
72	Fatehpur Sikri	OADM	Agra	OADM	40.0	YES	28	28

4. Following sites can be used for optional Additional ILA (If required).

SN	Route	Section	Location	Fiber Losses and Distance
1	Delhi - Kolkata	Bareilly-Shahjahanpur	Bilpur	1. Bareilly- Bilpur ,40km 20db 2. Bilpur- Shahjahanpur ,40km 18db
2	Delhi - Kolkata	Balamau- Lucknow	Malihabad	1. Balamau- Malihabad , 50km 22db 2. Malihabad- Lucknow 32km, 22db
3	Delhi- Mumbai	Mumbai-Vasai	Andheri	1. Mumbai- Andheri 18.5 Km, 15db 2. Andheri- Vasai 33km, 20 db
4	Delhi- Mumbai	Vasai-Boisar	Virar	1. Vasai -Virar 10km,7db 2. Virar- Boisar 45km, 25 db
5	Chennai- Bangalore	Trichy-Ariyalur	Lalgudi	1. Lalgudi- Trichy 35km ,18db 2. Lalgudi- Ariyalur 50Km, 22db
6	Chennai- Bangalore	Trichy-Karur	Petavatali	1. Petavatali- Trichy 33.5km,18db 2. Petavatali- Karur 58.5km,22db

5. Existing Network

a. Mumbai-Secunderabad

S. N	Segment	Direction	Fiber Length (In Km)	Fiber Type	Fiber Loss (In db)
1	Secunderabad-Bhongir	Forward	56	G652D	19.8
2		Reverse		G652D	21.5
3	Bhongir-Janagoan	Forward	36	G652D	15.9
4		Reverse		G652D	14
5	Janagoan-Kazipet	Forward	53	G652D	19.4
6		Reverse		G652D	17.7
7	Kazipet-Jammikunta	Forward	38.3	G652D	17.8
8		Reverse		G652D	14
9	Jammikunta-Ramagundam	Forward	57	G652D	20.7
10		Reverse		G652D	22.4
11	Ramagundam-Sirpur	Forward	72	G652D	22.4

12	Kagaznagar	Reverse		G652D	23.1
13	Sirpurkagaznagar-Ballarshah	Forward	70	G652D	22
14		Reverse		G652D	21
15	Ballarshah-Warora	Forward	64	G652D	29.3
16		Reverse		G652D	26.9
17	Warora-Wardha	Forward	77.5	G652D	28
18		Reverse		G652D	28.8
19	Wardha-Dhamangoan	Forward	52	G652D	19.7
20		Reverse		G652D	24.7
21	Dhamangoan-Badnera	Forward	49	G652D	17.6
22		Reverse		G652D	17.6
23	Badnera-Akola	Forward	85	G652D	32.6
24		Reverse		G652D	30.9
25	Akola-Shegoan	Forward	40	G652D	24.9
26		Reverse		G652D	21.4
27	Shegoan-Malkapur	Forward	57	G652D	26.8
28		Reverse		G652D	27.9
29	Malkapur-Bhusawal	Forward	56	G652D	25.7
30		Reverse		G652D	24.6
31	Bhusawal-Jalgoan	Forward	26	G652D	19.1
32		Reverse		G652D	17.5
33	Jalgoan-Pachora	Forward	51	G652D	15.7
34		Reverse		G652D	17.2
35	Pachora-Chalisgoan	Forward	45	G652D	20.5
36		Reverse		G652D	18.1
37	Chalisgoan-Nandagoan	Forward	45	G652D	21.2
38		Reverse		G652D	15.4
39	Nandagoan-Manmad	Forward	27	G652D	20.1
40		Reverse		G652D	14.3
41	Manmad-Nashik	Forward	78	G652D	28.6
42		Reverse		G652D	32.3
43	Nashik-Igatpuri	Forward	57	G652D	30.7
44		Reverse		G652D	28.8
45	Igatpuri-Asangoan	Forward	57	G652D	31.2
46		Reverse		G652D	28.5
47	Asangoan-Kalyan	Forward	34	G652D	23.4
48		Reverse		G652D	21.6
49	Kalyan-Kurla	Forward	43	G652D	25.8
50		Reverse		G652D	25.8
51	Kurla-Mahalaxmi	Forward	15	G652D	20.8
52		Reverse		G652D	22.7
53	Mahalaxmi-Panvel	Forward	53	G652D	27.6
54		Reverse		G652D	32.8
55	Panvel-Lonavala	Forward	62	G652D	31.5
56		Reverse		G652D	31.6

57	Lonavala-Pune	Forward	70	G652D	27.4
58		Reverse		G652D	31
59	Pune-Yawat	Forward	45	G652D	22.2
60		Reverse		G652D	23.4
61	Yawat-Daund	Forward	35	G652D	20.7
62		Reverse		G652D	23.4
63	Daund-Bhigwan	Forward	31	G652D	15.5
64		Reverse		G652D	18.1
65	Bhigwan-Kurudwadi	Forward	86	G652D	32.7
66		Reverse		G652D	20.6
67	Kurudwadi-Sholapur	Forward	86	G652D	27.4
68		Reverse		G652D	30.8
69	Sholapur-Dudani	Forward	67	G652D	30.1
70		Reverse		G652D	24.7
71	Dudani-Gulbarga	Forward	53	G652D	20.9
72		Reverse		G652D	23
73	Gulbarga-Wadi	Forward	40	G652D	15.2
74		Reverse		G652D	18.8
75	Wadi-Tandur	Forward	70	G652D	26
76		Reverse		G652D	33.5
77	Tandur-Vikarabad	Forward	48	G652D	20.3
78		Reverse		G652D	23.1
79	Vikarabad-Secunderabad	Forward	83	G652D	32.2
80		Reverse		G652D	30.5
81	Pune - Yawat-1	Forward	45.5	G652D	7.9
82		Reverse		G652D	19.5
83	Yawat-1 - Daund-1	Forward	40	G652D	29.8
84		Reverse		G652D	33.4
85	Daund-1 - Visapur	Forward	50	G652D	21.4
86		Reverse		G652D	19.3
87	Visapur - Ahmednagar	Forward	34	G652D	18.3
88		Reverse		G652D	12.2
89	Ahmednagar - Belapur	Forward	67	G652D	24.4
90		Reverse		G652D	20.8
91	Belapur - Kopargaon	Forward	45	G652D	17.9
92		Reverse		G652D	15.8
93	Kopargaon - Manmad	Forward	41	G652D	14.6
94		Reverse		G652D	15.8
95	Wardha - Nagpur	Forward	85	G652D	32.9
96		Reverse		G652D	31.7

b. Secunderabad—Chennai

S.N	Segment	Direction	Fiber Length (In Km)	Fiber Type	Fiber Loss (In db)
1	Chennai-Gummidipoondi	Forward	64	G652D	27.4
2		Reverse		G652D	28.1
3	Gummidipoondi-Sullurpet	Forward	50	G652D	18.3
4		Reverse		G652D	16.8
5	Sullurpet-Gudur	Forward	64	G652D	24.1
6		Reverse		G652D	27.4
7	Gudur-Nellore	Forward	45	G652D	18.6
8		Reverse		G652D	18.8
9	Nellore-Kavali	Forward	55	G652D	22.4
10		Reverse		G652D	23.1
11	Kavali-Ongole	Forward	74	G652D	28.1
12		Reverse		G652D	30.2
13	Ongole-Bapatla	Forward	72	G652D	28.4
14		Reverse		G652D	23.1
15	Bapatla-Tenali	Forward	46.5	G652D	17.5
16		Reverse		G652D	18.7
17	Tenali-Vijayawada	Forward	35.9	G652D	20.1
18		Reverse		G652D	17.9
19	Vijayawada-Guntur	Forward	42	G652D	16.1
20		Reverse		G652D	17.2
21	Guntur-Sattenapalli	Forward	46	G652D	21.2
22		Reverse		G652D	19.1
23	Sattenapalli-Nadikudi	Forward	62	G652D	25.3
24		Reverse		G652D	24.3
25	Nadikudi-Miryalaguda	Forward	44	G652D	19.7
26		Reverse		G652D	19.1
27	Miryalaguda-Nalgonda	Forward	42.44	G652D	16.8
28		Reverse		G652D	17.4
29	Nalgonda-Nagireddipalli	Forward	65.84	G652D	24.2
30		Reverse		G652D	24.3
31	Nagireddipalli-Secunderabad	Forward	60	G652D	27.8
32		Reverse		G652D	30.5
33	Secunderabad-Shadnagar	Forward	59	G652D	25
34		Reverse		G652D	24.7
35	Shadnagar-Mahabubnagar	Forward	54	G652D	22.5
36		Reverse		G652D	19
37	Mahabubnagar-Wanaparthy Road	Forward	60.5	G652D	17.3
38		Reverse		G652D	17.1
39	Wanaparthy Road-Gadwal	Forward	25	G652D	11.8
40		Reverse		G652D	11.4
41	Gadwal-Kurnool	Forward	55.4	G652D	19.2
42		Reverse		G652D	18
43	Kurnool-Dhone	Forward	54	G652D	18.2

44		Reverse		G652D	14.3
45	Dhone-Guntakal	Forward	78.4	G652D	18.7
46		Reverse		G652D	19.1
47	Guntakal-Gooty	Forward	31	G652D	22.5
48		Reverse		G652D	17.3
49	Gooty-Tadipatri	Forward	56.4	G652D	28.5
50		Reverse		G652D	23.1
51	Tadipati-Yerragunta	Forward	78	G652D	29.4
52		Reverse		G652D	31.2
53	Yerraguntla-Kadapa	Forward	45	G652D	19.6
54		Reverse		G652D	23.3
55	Kadapa-Rajampet	Forward	55	G652D	22.9
56		Reverse		G652D	22.8
57	Rajampet-Kodur	Forward	36	G652D	16.5
58		Reverse		G652D	16.6
59	Kodur-Renigunta	Forward	41	G652D	21.7
60		Reverse		G652D	21.2
61	Renigunta-Arakonnam	Forward	87	G652D	34.3
62		Reverse		G652D	32.2
63	Arakonnam-Tiruvallur	Forward	31	G652D	14.1
64		Reverse		G652D	12.8
65	Tiruvallur-Chennai	Forward	54	G652D	24.6
66		Reverse		G652D	25.8

रेलटेल
RAILTEL

c. Chennai -Bangalore-Guntakal-Wadi

S.N	Segment	Direction	Fiber Length (In Km)	Fiber Type	Fiber Loss (In db)
1	Chennai-Tiruvallur	Forward	53.6	G652D	24.2
2		Reverse		G652D	24
3	Tiruvallur-Arakonnam	Forward	30	G652D	19.5
4		Reverse		G652D	14.2
5	Arakonnam-Katpadi	Forward	68.2	G652D	24.9
6		Reverse		G652D	25.4
7	Katpadi-jolarpet	Forward	93	G652D	33.9
8		Reverse		G652D	33.7
9	Jolarpet-Kuppam	Forward	47.5	G652D	21
10		Reverse		G652D	20.3
11	Kuppam-Bangarpet	Forward	39.7	G652D	21.8
12		Reverse		G652D	16
13	Bangarpet-whitefield	Forward	52.8	G652D	27.1
14		Reverse		G652D	23
15	Whitefield-Bangalore	Forward	27.4	G652D	24.8
16		Reverse		G652D	19.1
17	Bangalore-Yelahanka	Forward	23	G652D	20
18		Reverse		G652D	22.9
19	Yelahanka-Dodballapur	Forward	23	G652D	17.9
20		Reverse		G652D	21
21	Dodballapur-Hindupur	Forward	70	G652D	33.3
22		Reverse		G652D	31
23	Hindupur-Penukonda	Forward	42	G652D	24.7
24		Reverse		G652D	20
25	Penukonda-Dharmavaram	Forward	48	G652D	18.1
26		Reverse		G652D	17
27	Dharmavaram-Anantapur	Forward	36	G652D	17.6
28		Reverse		G652D	22
29	Anatapur-Gooty	Forward	66.7	G652D	36.5
30		Reverse		G652D	35.4
31	Gooty-Guntakal	Forward	31	G652D	21
32		Reverse		G652D	16
33	Guntakal-Adoni	Forward	59	G652D	25.6
34		Reverse		G652D	24.2
35	Adoni-Raichur	Forward	78	G652D	29
36		Reverse		G652D	28.9
37	Raichur-Yadgir	Forward	78	G652D	28
38		Reverse		G652D	29
39	Yadgiri-Wadi	Forward	45	G652D	22.2
40		Reverse		G652D	22.5

d. Vijayawada -Kolkatta & Kolkata-Nagpur

No.	Segment	Fiber Length (Tendor)	Forward Direction	Revere Direction
			Fiber Lo (dB)	Fiber Lo (dB)
1	Vijayawada - Eluru	68	26.8	26.8
2	Eluru - Tadepaligudem	56.5	26.3	20.7
3	Tadepaligudem - Rajahmundry	49	18.4	22.3
4	Rajahmundry - Samalkot	57	25	21.7
5	Samalkot - Tuni	60	26.9	23.8
6	Tuni - Anakapalli	72	25.6	25.6
7	Anakapalli - Vishakhapatnam	42	22	27.6
8	Vishakhapatnam - Kottavalasa	32.78	16.13	16.13
9	Kottavalasa - Vijaynagram	39.24	16.89	16.89
10	Vijaynagram - Chipurupalli	33.3	14.53	14.53
11	Chipurupalli - Srikakulam Road	42.6	18.86	18.86
12	Srikakulam Road - Kotabommali	37.8	13	13
13	Kotabommali - Palasa	43.4	15.14	15.14
14	Palasa - Jaduguria	42.5	14.6	14.6
15	Jaduguria - Behrampur	39.8	13	13
16	Behrampur - Huma	44.3	14.4	14.4
17	Huma - Balugaon	45	15.1	15.1
18	Balugaon - Kalupada Ghat	43	17.5	17.5
19	Kalupada Ghat - Khurda Rd.	40.2	16.2	16.2
20	Khurda Rd. - Bhuvaneshwar	53.2	16.7	21.7
21	Bhuvaneshwar - Cuttak	31.3	17.1	17
22	Cuttak - Dhanmandal	43.6	16.1	16.1
23	Dhanmandal - Jajpur	41	15	15
24	Jajpur - Bhadrak	49.2	27.9	25.2
25	Bhadrak - Balasore	67.2	27	27.9
26	Balasore - Jaleshwar	52.8	20.1	24.9
27	Jaleshwar - Datan	18.44	7.5	7.5
28	Datan - Kharagpur Jn.	57.65	22.34	22.34
29	Kharagpur Jn. - Panskura	48	24.1	20.2
30	Panskura - Bagnan	38	23.7	23.8
31	Bagnan - Kolkatta	56.5	25	25
32	Nagpur - Chacher	36	24.5	21.1
33	Chacher - Tumsar Road	64	25	20.7
34	Tumsar Road - Gondia	50	26.3	24.1
35	Gondia - Salakesa	64	21.9	22.3
36	Salakesa - Dongargarh	40	17.4	17.4
37	Dongargarh - Rajnandgaon	34.5	14.9	14.9
38	Rajnandgaon - Durg	55	19.7	25.8

39	Durg - Raipur	74	20.4	20.7
40	Raipur - Shilyari	72	26.5	23.3
41	Shilyari - Hathbandh	72	26.5	23.3
42	Hathband - Nipania	33	12.5	12.5
43	Nipania -Bilaspur	35	13.6	13.6
44	Bilaspur - Champa	52	23.8	26.4
45	Champa - Kharsia	49.5	17.48	17.48
46	Kharsia - Raigarh	41.5	18.51	18.51
47	Raigarh - Jharsuguda	81	26	27.5
48	Jharsiguda - Sagra	63	25.8	20.8
49	Sagra - Rourkela	47	19.8	19.5
50	Rourkela - Manoharpur	44.1	20.6	21.8
51	Manoharpur - Chakradharpur	67	25.5	25.4
52	Chakradharpur - Sini	43.43	21	21
53	Sini - Tata Nagar	33.24	18	18
54	Tata Nagar - Dalbumgarh	52.5	24	23.9
55	Dalbumgarh - Jhargram	48	13.65	13.65
56	Jhargram - Kharagpur Jn.	43.42	12.09	12.09
57	Kharagpur - Chandrakona	54.1	18.45	18.45
58	Chandrakona - Bishnupur	39.84	13.43	13.43
59	Bishnupur - Adra	89	26.3	28.4
60	Adra - Asansol	55.5	14.9	21.1
61	Asansol -Durgapur	49.5	28	25.2
62	Durgapur - Khana	54.5	19.1	22.2
63	Khana - Jaugram	47.5	16.4	19.6
64	Jaugram - Kamarkundu	33.5	19	19
65	Kamarkundu - Kolkatta	43.3	20	20
66	Raipur - Mahasamund	56.5	24.1	24.4
67	Mahasamund - Nawapada Rd	65.5	24.7	22.5
68	Nawapada Rd - HArishankarN	34.5	20.3	20.3
69	HarishankarN - Titilagarh	61	16.4	16.4
70	Titilagarh - Langigarh	51.5	20.3	20.3
71	Langigarh - Muniguda	42	16.4	16.4
72	Muniguda - Rayagada	60	23.8	22.7
73	Rayagada - Parvatipuram	76.87	19.78	19.78
74	Parvatipuram - Bobbili	25.52	16.08	16.08
75	Bobbili - Vijaynagram	51.37	13.68	13.68

1. Delhi-Kolkata

a. New DWDM Segments

S.No.	Name of the Segment
1	Delhi-Ghaziabad
2	Delhi-NIC(SP)—Ghaziabad
3	Ghaziabad-Hapur-Moradabad-Lucknow
4	Ghaziabad-Aligarh-Tundla-Kanpur
5	Kanpur-Lucknow
6	Kanpur-Allahabad
7	Allahabad-Katni
8	Allahabad-Mughalsarai.
9	Lucknow- Varanasi-Mughalsarai
10	Mughalsarai-Patna-Asansol
11	Mughalsarai-Gaya-Asansol
12	Tundla-Agra

b. ILA & OADM Locations

S. No.	Site Name	Equipment Type (10G or 100G)	Type of Equipment's (ILA or OADM)	OADM Degree
Main Path 1: Delhi-Tundla-Kanpur				
1	NDLS	100 G	OADM	2
2	NIC-SP	100 G	OADM	2
3	Ghaziabad	100 G	OADM	4
4	Khurja	-	ILA	-
5	Aligargh	-	ILA	-
6	Pora	-	ILA	-
7	Tundla	100 G	OADM	3
8	Sikohabad	-	ILA	-
9	Etawa	-	ILA	-
10	Phaphund	-	ILA	-
11	Rura	-	ILA	-
12	Kanpur	100 G	OADM	3
13	AGRA	100G	OADM	1
Protection Path 1 : Delhi-Moradabad-Lucknow				
	Ghaziabad	-	-	-
1	Hapur	-	ILA	-
2	Gajrola	-	ILA	-
3	Moradabaad	-	ILA	-
4	Rampur	-	ILA	-
5	Bareilly	-	ILA	-
6	Shajahanpur	-	ILA	-
7	Hardoi	-	ILA	-
8	Balamau	-	ILA	-

9	Lucknow	100 G	OADM	3
10	Ajgain	-	ILA	-
	Kanpur			
Main Path 2: Kanpur-Allahabad-Mughalsarai				
	Kanpur	-	-	-
1	Aung		ILA	
2	Fatehpur	-	ILA	-
3	Katoghan		ILA	
4	Bharwari	-	ILA	-
5	Allahabad	100G	OADM	3
6	Mejaroad	-	ILA	-
7	Vindhyachal	-	ILA	-
8	Chunar	-	ILA	-
9	Mughalsarai	100 G	OADM	4
Protection Path 2 : Lucknow-Varanasi-MughalSarai				
	Lucknow			
1	Raibarali	-	ILA	-
2	Gauriganj	-	ILA	-
3	Pratapgarh	-	ILA	-
4	Janghai		ILA	
5	BHADOHI	-	ILA	-
6	Varanasi	-	ILA	-
	Mughalsarai			
Main Path 3: Mughalsarai-Gaya-Asansol				
	Mughalsarai			
1	Babua Road	-	ILA	-
2	Sasaram	-	ILA	-
3	Rafiganj		ILA	
4	Gaya	-	ILA	-
5	Paharpur	-	ILA	-
6	Koderma	-	ILA	-
7	Parasnath	-	ILA	-
8	Dhanbad		ILA	
9	Asansol	100 G	OADM	2
Protection Path 3 : Mughalsarai-Patna-Asansol				
	Mughalsarai			
1	Zamania	-	ILA	-
2	Buxar	-	ILA	-
3	ARA	-	ILA	-
4	Patna		ILA	
5	Bhaktiarpur		ILA	
6	Mokama	-	ILA	-
7	Kiul	-	ILA	-
8	Jhajha	-	ILA	-
9	Jasidih	-	ILA	-
10	Madhupur	-	ILA	-
	Asansol			

Main Path 4: Allahabad-Katni				
	Allahabad			
1	Shankargarh	-	ILA	-
2	Manikpur	-	ILA	-
3	Satna	-	ILA	-
4	Maihar	-	ILA	-
5	Katni	100 G	OADM	1

2. Delhi-Mumbai

a. New DWDM Segments

S.No.	Name of the Segment
1	Delhi-Gurgaon
2	Gurgaon-Jaipur
3	Jaipur-Sawai Madhopur-Kota
4	Kota-Bina
5	Jaipur-Marwar Jn
6	Marwar -Ahmadabad --Jn-Pratap Nagar
7	Pratap Nagar—Surat
8	Surat—Vasai
9	Vasai-Mumbai
10	Delhi-Okhla
11	Okhla-Agra
12	Agra-Bina
13	Bina-Bhopal--Itarsai
14	Itarsai-Bhusaval
15	Bhusaval-Surat
16	Sawai Madhopur-Agra

b. ILA & OADM Locations

S. No.	Site Name	Equipment Type (100G)	Type of Equipment's (ILA or OADM)	OADM Degree
Main Path : Delhi-Jaipur-Pratap Nagar-Surat-Mahalakshmi				
1	Gurgaon	100G	OADM	2
2	NDLS	100G	OADM	2
3	Rewari	-	ILA	-
4	Narnaul	-	ILA	-
5	Nim Ka Thana	-	ILA	-
6	Ringus	-	ILA	-
7	Jaipur	100G	OADM	3
8	Phulera	-	ILA	-
9	Ajmer	-	ILA	-
10	Chandawal	-	ILA	-
11	Beawar	-	ILA	-

12	Marwar	100G	OADM	2
13	Bhagwanpura	-	ILA	-
14	Sirohi Raod	-	ILA	-
15	Abu Road	-	ILA	-
16	Palanpur	-	ILA	-
17	Mehsana	-	ILA	-
18	Ahemdabad	100G	OADM	2
19	Anand	-	ILA	-
20	Pratapnagar	100G	OADM	2
21	Palej	-	ILA	-
22	Panoli	-	ILA	-
23	Surat	100G	OADM	3
24	Valsad	-	ILA	-
25	Bhilad	-	ILA	-
26	Boisar	-	ILA	-
27	Mumbai	100G	OADM	1
28	Vasai	100G	OADM	2
Protection Path1: Delhi-Mathura-Agra-Jhansi-Bina-Bhopal-Itarsi-Bhusawal-Nardana-Surat				
1	Okhla	100G	OADM	2
2	Palwal	-	ILA	-
3	Kosi	-	ILA	-
4	Mathura	-	ILA	-
5	Agra	100 G	OADM	2
6	Dholpur	-	ILA	-
7	Gawalior	-	ILA	-
8	Dabra	-	ILA	-
9	Jhansi	-	ILA	-
10	Talbhat	-	ILA	-
11	Lalitpur	-	ILA	-
12	Bina	100 G	OADM	3
13	Ganjbasoda	-	ILA	-
14	Vidisha	-	ILA	-
15	Bhopal	100G	OADM	2
16	Obdullaganj	-	ILA	-
17	Itarsi	100 G	OADM	2
18	Harda	-	ILA	-
19	Channera	-	ILA	-
20	Khandwa	-	ILA	-
21	Burhanpur	-	ILA	-
22	Bhusawal	100 G	OADM	2
23	Jalgaon	-	ILA	-
24	Amalner	-	ILA	-
25	Naranda	-	ILA	-
26	Nandurbar	-	ILA	-
27	Navapur	-	ILA	-
28	Ukai_Songarh	-	ILA	-
29	Madhi	-	ILA	-
	Surat			

Protection Path 2 : Jaipur-Kota-Bina				
	Jaipur	-		-
1	Siras	-	ILA	-
2	Sawai Madhopur	-	OADM	3
3	Laban	-	ILA	-
4	Kota	100 G	OADM	2
5	Baran	-	ILA	-
6	Chhabra	-	ILA	-
7	Guna	-	ILA	-
8	Ashok Nagar	-	ILA	-
	Bina			

3. Bangalore-Mumbai & Bangalore-Chennai

a. New DWDM Segments:

S.No.	Name of the Segment
1	Bangalore - Hassan (via CNPA)
2	Hassan - Arsikere
3	Hassan - Manglore
4	Manglore - Madgaon (Goa)
5	Madgaon (Goa) - Panvel
6	Pune-Miraj - Londa
7	Madgaon (Goa) - Londa
8	Londa - Hubli
9	Hubli - Arsikere
10	Arsikere - Bangalore
11	Hubli - Guntakal
12	Chennai - Trichy
13	Trichy - Erode
14	Erode - Bangalore
15	Pune - Panvel

b. ILA & OADM Locations:

S. No.	Site Name	Equipment Type (10G or 100G)	Type of Equipment's (ILA or OADM)	OADM Degree
Main Path 1: Panvel-Pune-Londa				
1	Panvel	100G	OADM	2
2	Lonavala		ILA	
3	Pune	100G	OADM	2
4	Jejuri		ILA	
5	Nira	-	ILA	-
6	Satara	-	ILA	-
7	Karad	-	ILA	-
8	Sangli	-	ILA	-

9	Miraj	100G	OADM	2
10	Kudachi	-	ILA	-
11	Ghataprabha	-	ILA	-
12	Belgaon	-	ILA	-
13	Londa	100 G	OADM	3
Protection Path 1 : Panvel to Madgaon				
	Panvel			
1	Roha	-	ILA	-
2	Mangaon	-	ILA	-
3	Veer	-	ILA	-
4	Karjanwadi	-	ILA	-
5	Khed	-	ILA	-
6	Chiplaun	-	ILA	-
7	Savarda	-	ILA	-
8	Sangameshwar	-	ILA	-
9	Ratnagiri	-	ILA	-
10	Adava	-	ILA	-
11	Vilvade	-	ILA	-
12	Vaibhawadi	-	ILA	-
13	Kudal	-	ILA	-
14	Sawantwadi	-	ILA	-
15	Thivem	-	ILA	-
16	Karmali	-	ILA	-
17	Madgaon	100 G	OADM	3
	Londa	-	-	-
Main Path 2: Madgaon-Londa-Hubli-Ariskeri-Bangalore				
	Madgaon			
1	Castlerock		ILA	
	Londa			
2	Alnawar		ILA	
3	Hubli	100 G	OADM	3
4	Haveri	-	ILA	-
5	Davangere	-	ILA	-
6	Chikjajur	-	ILA	-
7	Birur	-	ILA	-
8	Arsikere	100 G	OADM	3
9	Tiptur	-	ILA	-
10	Tumkur	-	ILA	-
11	Dodbele	-	ILA	-
12	Bangalore	100G	OADM	3
Protection Path 1 : Madgaon-Mangalore-Mysore-Bangalore				
	Madgaon	-	-	-
1	Cancona	-	ILA	-
2	Karwan	-	ILA	-
3	Ankola	-	ILA	-
4	Kumta	-	ILA	-
5	Murudeshwar	-	ILA	-
6	Bhatkal	-	ILA	-

7	Senapura	-	ILA	-
8	Kundapura	-	ILA	-
9	Udupi	-	ILA	-
10	Suratkal	-	ILA	-
11	MAQ (Manglore)	100 G	OADM	2
12	Kabakputtur	-	ILA	-
13	Sub-RD	-	ILA	-
14	Saklespur	-	ILA	-
15	Hassan	100G	OADM	3
16	CNPA	-	ILA	-
17	KIGL	-	ILA	-
	Bangalore		-	-
3rd Protection Path to Bangalore-Chennai				
	Bangalore			
1	Hosur	-	ILA	-
2	Dharamapuri	-	ILA	-
3	Salem	-	ILA	-
4	Erode	100G	OADM	2
5	Karur	-	ILA	-
6	Trichi	100G	OADM	2
7	Ariyalur	-	ILA	-
8	Virudhachalam	-	ILA	-
9	Villipuram	-	ILA	-
10	Tindivaram	-	ILA	-
11	Chengalpattu	-	ILA	-
12	Tambaram	-	ILA	-
13	Chennai		OADM	1
Path 4 : Hubli-Guntakal				
1	Hubli			
2	Gadag	-	ILA	-
3	Koppal	-	ILA	-
4	Hospet	-	ILA	-
5	Bellary	-	ILA	-
6	Guntakal	100 G	OADM	1

रेलटेल
RAILTEL

Annexure-III

Ciena make DWDM:

1. Photonics details
 - a. WSS : 9x1 WSS
 - i. C-band, 1528.77 to 1566.72 nm.
 - ii. Flex Grid enabled
 - iii. Demux Insert loss (Max): 11.7 dB
 - iv. Mux Insert loss (Max): 6.8 dB
 - b. Mux/Demux
 - i. 100GHz 44 Channel module
 - ii. C-band 1530 nm to 1564.68
 - iii. Add Insert loss (max): 6.0 dB
 - iv. Drop Insert loss (max): 6.6 dB
2. Architecture of ROADM :Directional ROADM
3. OSNR of existing TXPs :Not Applicable for design validation
4. DGE sites :Not specifically used
5. Amplifier Noise Figure
 - i. Line A: ~ 6.6 to 8.2 dB
 - ii. Line B: ~ 6.4 to 7.9 dB

Adva make DWDM:

1. Photonics details
 - a. WSS : 8x1 WSS & 4x1 WSS
 - i. C-band, 1529.94 to 1561.42 nm.
 - ii. Demux Insert loss (Max): 7.8 dB
 - iii. Mux Insert loss (Max): 12.4 dB
 - b. Mux/Demux
 - i. 50GHz 40 Channel module
 - ii. C-band 19590-19200
 - iii. Add Insert loss (max): 6.0 dB
 - iv. Drop Insert loss (max): 6.6 dB
2. Architecture of ROADM :Directional ROADM
3. OSNR of existing TXPs :Not Applicable for design validation
4. DGE sites :Not specifically used
5. Amplifier Noise Figure
 - i. Line A: 5.5dB
 - ii. Line B: ~ 5-10 dB

Annexure-IV

1. Pratap Nagar ---Nagda—Bhopal--Agra

SN	END A	END A Type : OADM or ILA	END B	END B Type : OADM or ILA	Fiber Length (in Km)	Fiber Type (G652D or not)	1st Fiber Loss (in dBm)	2nd Fiber Loss (in dBm)
1	Ahemdabad	OADM	Anand	OADM	72	YES	35	35
2	Pratap Nagar	OADM	Anand	OADM	50.0	YES	33	33
3	Anand	OADM	Godhra	OADM	60.0	YES	32	32
4	Pratap Nagar	OADM	Chapaner	ILA	50.0	YES	24	24.4
5	Chapaner	ILA	Godhra	OADM	40.0	YES	22	22.4
6	Godhra	OADM	Pilad	ILA	36.7	YES	20	20
7	Pilad	ILA	Dahod	ILA	43.1	YES	21	21
8	Dahod	ILA	Thandla	ILA	49.6	YES	24	24
9	Thandla	ILA	Bamania	ILA	31.4	YES	18	18
10	Bamania	ILA	Ratlam	OADM	54.4	YES	26	26
11	Ratlam	OADM	Nagda	OADM	43.0	YES	22	22
12	Nagda	OADM	Ujjain	OADM	55.0	YES	18	18.4
13	Ujjain	OADM	Maksi	OADM	45.0	YES	14	14.2
14	Maksi	OADM	Sujalpur	ILA	65.0	YES	19	20
15	Sujalpur	ILA	Sehore	ILA	45.0	YES	14	15.5
16	Sehore	ILA	Bhopal	OADM	45.0	YES	15	15.3
17	Vikramgarh	ILA	Nagda	OADM	45.0	YES	23	23.2
18	Shamgarh	ILA	Vikramgarh	ILA	48.0	YES	28	27.7
19	Ramganj Mandi	ILA	Shamgarh	ILA	64.0	YES	29	29
20	Kota	OADM	Ramganj Mandi	ILA	79.0	YES	32	31.8

2. Manmad—Secunderabad.

SN	END A	END A Type : OADM or ILA	END B	END B Type : OADM or ILA	Fiber Length (in Km)	Fiber Type (G652D or not)	1st Fiber Loss (in dBm)	2nd Fiber Loss (in dBm)
1	Manmad	OADM	Chalesgoan	ILA	78.2	Yes	20	20
2	Manmad	OADM	Rotegaon	ILA	59.754	Yes	18	18.1
3	Rotegaon	ILA	Aurangabad	ILA	68.331	Yes	20	20.1
4	Aurangabad	ILA	Jalna	ILA	69	Yes	20	20
5	Jalna	ILA	Usmanpur	ILA	69	Yes	20	20
6	Usmanpur	ILA	Parbhani	OADM	58.1	Yes	20	20
7	Parbhani	OADM	Purna	ILA	67.8	Yes	22	22
8	Purna	ILA	Nanded	OADM	67.8	Yes	22	22
9	Nanded	OADM	Mudkhed	OADM	26.6	Yes	9	9

10	Mudkhed	OADM	Basar	ILA	66.6	Yes	17.4	17.4
11	Basar	ILA	Nizamabad	OADM	34	Yes	8.4	8.6
12	Nizamabad	OADM	Kamareddy	ILA	58	Yes	14.3	14.7
13	Kamareddy	ILA	Manoharabad	ILA	77.5	Yes	14.2	14.7
14	Manoharabad	ILA	SC	OADM	60	Yes	20.8	20.8

3. Delhi Access (Noida to Ghaziabad)

SN	END A	END A Type : OADM or ILA	END B	END B Type : OADM or ILA	Fiber Length (in Km)	Fiber Type (G652D or not)	1st Fiber Loss (in dBm)	2nd Fiber Loss (in dBm)
1	Sec 16 Noida	OADM	Mayur Vihar	OADM	8	YES	9	9
2	Mayur Vihar	OADM	Barakhmabha Road	OADM	10	YES	10	10
3	Barakhmabha Road	OADM	Anand Vihar	OADM	10	YES	12	12
4	Anand Vihar	OADM	GZB	OADM	14	YES	22	22

4. Chandigarh –Shimla.

SN	END A	END A Type : OADM or ILA	END B	END B Type : OADM or ILA	Fiber Length (in Km)	Fiber Type (G652D or not)	1st Fiber Loss (in dBm)	2nd Fiber Loss (in dBm)
CDG -SHIMLA (MWDM)								
1	Chandigarh	OADM	Kalka	OADM	27.1	Yes	12	12
2	Kalka	OADM	Solan	ILA	53.7	Yes	26	26
3	Solan	ILA	Simla	OADM	58.8	Yes	29	29

5. Bangalore & Chennai Access

SN	END A	END A Type : OADM or ILA	END B	END B Type : OADM or ILA	Fiber Length (in Km)	Fiber Type (G652D or not)	1st Fiber Loss (in dBm)	2nd Fiber Loss (in dBm)
1	Chennai	OADM	Thiruvallur	ILA	51.5	YES	25	25
2	Thiruvallur	ILA	Arrakonam	OADM	30.6	YES	12.2	12
3	Arrakonam	OADM	katapadi	OADM	68.5	YES	21.8	21
4	katapadi	OADM	Jolarpet	OADM	94.1	YES	29.1	29
5	Jolarpet	OADM	Bangarpet	OADM	87	YES	36.5	36.5
6	Bangarpet	OADM	Whitefield	OADM	53.2	YES	16.12	16.12
7	Whitefield	OADM	Bypanhalli	OADM	14	YES	12	12
8	Bypanhalli	OADM	SBC	OADM	13.2	YES	13	13
9	Chennai	OADM	Gumdipendi	ILA	60.8	YES	26	26
10	Gumdipendi	OADM	Sullurpet	ILA	41.8	YES	16	16
11	Sullurpet	ILA	Gudur	OADM	63.6	YES	25.6	25.8
12	Gudur	OADM	VKI	ILA	40.2	YES	14.7	14.7
13	VKI	ILA	Reningunta	OADM	53.7	YES	17.5	17

14	Reningunta	OADM	Tirupatti	ILA	12.8	YES	6.4	6
15	Tirupatti	ILA	Pakalda	ILA	48.8	YES	19.8	19
16	Pakalda	ILA	katapadi	OADM	68.5	YES	17.6	17
17	Jolarpet	OADM	Dasampatti	ILA	44	YES	20	20
18	Dasampatti	ILA	Salem	OADM	93	YES	36	36
19	NIC,SBC	OADM	SRIT,SBC	OADM	17.5	YES	15	15
20	SRIT,SBC	OADM	Whitefield	OADM	13	YES	18.8	18.8
21	Whitefield	OADM	Yenalanka	OADM	29.6	YES	19.5	19.5
22	Yenalanka	OADM	Yashwanthpur am	OADM	14.5	YES	17.2	17.2
23	Yashwanthpura m	OADM	Bangalore	OADM	7.8	YES	5.8	5.8
24	Yenalanka	OADM	Devenhalli	OADM	27.5	YES	8.5	8.5
25	Devenhalli	OADM	Chinthamani	ILA	58	YES	18	18
26	Chinthamani	ILA	Bangarpet	OADM	82	YES	24	24
27	Dindigul	OADM	Karur	OADM	75	YES	30	30
28	Karur	OADM	Salem	OADM	85	YES	32	32
29	Arrakonam	OADM	Reningunta	OADM	85	YES	35	35
30	Arrakonam	OADM	Chengalpattu	OADM	69	YES	32	32

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Annexure-V

1. Pratap Nagar –Nagda –Bhopal -Agra.

S. No.	Site Name	Type of Equipment's	OADM Degree
1	Pratap Nagar	OADM*	2
2	Chapaner	ILA	-
3	Godhra	OADM	3
4	Pilad	ILA	-
5	Dahod	ILA	-
6	Thandla	ILA	-
7	Bamania	ILA	-
8	Ratlam	OADM	2
9	Nagda	OADM	3
10	Ujjain	OADM*	2
11	Maksi	OADM*	2
12	Sujalpur	ILA	
13	Sehore	ILA	
14	Bhopal	OADM	1
15	Vikramgarh	ILA	-
16	Shamgarh	ILA	-
17	Ramganj Mandi	ILA	-
18	Kota	OADM	2
19	Anand	OADM	3
20	Ahmadabad	OADM	1

* Min 4 Channel OADM

2. Manmad—Secunderabad.

S. No.	Site Name	ILA or OADM	OADM Degree
1	Manmad	OADM	1
2	Rotegaon	ILA	
3	Chalisgaon	ILA	
4	Aurangabad	ILA	-
5	Jalna	ILA	
6	Usmanpur	ILA	
7	Parbhani	OADM*	2
8	Purna	ILA	
9	Nanded	OADM	2
10	Mudkhed	OADM*	2
11	Basar	ILA	
12	Nizamabad	OADM*	2
13	Kamareddy	ILA	
14	Manoharabad	ILA	

15	SC	OADM	1
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* Min 4 Channel OADM

3. Delhi Access (Noida to Ghaziabad).

S. No.	Site Name	ILA or OADM	OADM Degree
1	Anand Vihar	OADM	2
2	Noida	OADM	1
3	GZB	OADM	1
4	Barakhmabha in between Noida to Anand Vihar	FOADM*	2
5	Mayur Vihar in between Noida to Anand Vihar	FOADM*	2

* Passive OADM (Minimum 4 Channel)

4. Chandigarh –Shimla

S. No.	Site Name	ILA or OADM	OADM Degree
1	Chandigarh	OADM	1
2	Kalka	OADM	2
3	Solan	ILA	-
4	Simla	OADM	1

5. Bangalore & Chennai Access

S. No.	Site Name	No. of Equipments (ILA or OADM with no. of Direction)	OADM Degree
Path 1 : Chennai Bangalore Access Network			
	Chennai		-
1	Thiruvallur	ILA	-
2	Arrakonam	OADM	4
3	katapadi	OADM	3
4	Jolarpet	OADM	3
5	Bangarpet	OADM	3
6	Whitefield	OADM	4
7	Bypanhalli	OADM	2
8	Bangalore	OADM	2
Path 2: Chennai Bangalore Access Network			
	Chennai		
1	Gumdiendi	ILA	-
2	Sullurpet	ILA	
3	Gudur	OADM	2

4	VKI	ILA	
5	Reiningunta	OADM	3
6	Tirupatti	ILA	
7	Pakalda	ILA	
	katapadi		
Path 3 : Chennai Bangalore Access Network			
	Bangalore		-
1	NIC	OADM	1
2	SRIT	OADM	2
	Whitefield		
3	Yenalanka	OADM	4
4	Yashwanthpuram	OADM	2
	Bangalore		-
Path 4 : Chennai Bangalore Access Network			
	Yenalanka		
1	Devenhalli	OADM	2
2	Chinthamani	ILA	
	Bangarpet		
Path 5 : Chennai Bangalore Access Network			
	Salem		
1	Karur	OADM	2
2	Dindigul	OADM	1

Annexure-VI

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority [The Competent Authority for the purpose of registration under this Order shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT)].
- II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. "Bidder from a country which shares a land border with India" for the purpose of this Order means: -
 - a. An entity incorporated, established or registered in such a country; or
 - b. A subsidiary of an entity incorporated, established or registered in such a country; or
 - c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - d. An entity whose beneficial owner is situated in such a country; or
 - e. An Indian (or other) agent of such an entity; or
 - f. A natural person who is a citizen of such a country; or
 - g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
- IV. The beneficial owner for the purpose of (III) above will be as under:
 1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means. Explanation-
 - a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;
 - b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
 2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;

3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
6. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.
7. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

Certificate to be given by the Tenderer:

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

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

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

(END OF TENDER DOCUMENT)

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