

RFP No.: APSFL/OLA/284-2/2018, Dated 02/03/2019

Supply, Installation and Commissioning of DWDM Network Upgrade Equipment for AP Fiber Grid

Corrigendum 06, Dt:30.04.2019

Bidders may please note that this corrigendum document is part of this RFP. The items listed in the corrigendum will supersede the corresponding clauses in RfP

S. No.	Section	Clause	Brief Description of the clause	Page No	Revised clause
1	1.1 Key Events and Dates	Sno 6	Last date and time for submission of proposal (Proposal Due Date) On or Before 30/04/2019 at 3:00 PM The proposal is to be submitted on www.a procurement.gov.in on e-procurement portal.	7	Last date and time for submission of proposal (Proposal Due Date) On or Before 10/05/2019 at 3:00 PM The proposal is to be submitted on www.a procurement.gov.in on e-procurement portal.
2	1.1 Key Events and Dates	Sno 7	Date and time of opening of pre-qualification cum technical bids on e-procurement platform 30/04/2019 at 4:00 PM Andhra Pradesh State FiberNet Limited NTR Administrative Block, 3rd Floor, Pandit Nehru Bus Station, NH -65, Vijayawada - 520013 Web address: www.apsfl.in Email address: apsfl@ap.gov.in	7	Date and time of opening of pre-qualification cum technical bids on e-procurement platform 10/05/2019 at 4:00 PM Andhra Pradesh State FiberNet Limited NTR Administrative Block, 3rd Floor, Pandit Nehru Bus Station, NH -65, Vijayawada - 520013 Web address: www.apsfl.in Email address: apsfl@ap.gov.in
3	3. Scope	-	Revised Scope	12	Refer Annexure I
4	4 Pre-Qualification Criteria S.No. 2	Sno4	The bidder/any consortium member should have at least three OTN ASON based DWDM/OTN Indian network references & Ten Global OTN ASON Based references.	19	"The bidder or OEM or consortium member should have at least one OTN ASON based DWDM/OTN Indian network references & Ten Global OTN ASON Based references"
5	8. Annexure	8.10`	Revised Price Bid	40	Refer Annexure II

6	4 Pre-Qualification Criteria S.No. 2	New	Pre-Qualification Criteria (New Clause)	19	OEM or its group company should have presence in India for more than 10 Years. OEM or Indian Group Company must have 24X7 hotline & toll-Free help desk for service support in India with their own technical support in India and Abroad. OEM should have dedicated support center in Andhra Pradesh
7	8. Annexure	8.10`	New: Consortium Agreement	-	Refer Annexure III
8	7. Instructions to the Bidder	7.30`	"1. 40% of value payable against successful delivery of the equipment within 30 days from submission of invoice. Supporting Documents – Invoice & Delivery challan duly signed by APSFL / Authorized representative 2. 50% of value payable against successful supply, GO-Live & Acceptance from APSFL. Supporting Documents – Acceptance certificate duly signed by APSFL 3.10% of value will be given after 6 months from date of Go-Live and upon satisfactory certification from APSFL. Supporting Documents – Satisfactory certificate duly signed by APSFL"	29	1. 30% of value payable against successful delivery of the equipment within 30 days from submission of invoice. Supporting Documents – Invoice & Delivery challan duly signed by APSFL / Authorized representative 2. 60% of value payable against successful supply, GO-Live & Acceptance from APSFL. Supporting Documents – Acceptance certificate duly signed by APSFL 3.10% of value will be given as 2% per year for 5 years of warranty & maintenance period upon satisfactory certification from APSFL and after imposing Penalties if any. Supporting Documents – Satisfactory certificate duly signed by APSFL

Annexure I

1. Scope of Work

The selected bidder shall be responsible for the supply, installation and commissioning of the required DWDM Equipment to support all the existing functionality and the new requirements which are part of this tender (or) Integrate with existing DWDM equipment and support the new requirements which are part of the network. The bidder may choose to buy back all the existing equipment and propose altogether a completely new solution also with a clear plan of the rollout strategy to have minimal service impact to the live services.

The selected bidder shall also carry out operation, support and Maintenance of Supplied equipment for a period of five years from the date of Go-live. Therefore, the bidder is advised to procure sufficient spares to maintain the up time.

The network shall be deployed over existing aerial fibre network of APSFL and designed to cater to all the running services along with the new services which are part of this RFP.

3.1 Functional Requirement.

The bidder solution should make sure that each district is equipped with a dedicated capacity of at least 200G running across the two DCs in Vizag and Amaravathi.

The bidder solution should make sure that at least 400G of OTN capacity is factored in for any district to any district communication in the state ring and there should be possibility to make use of the same for the inter zonal OTN traffic across districts.

The bidder solution should have at least 200G of OTN capacity for any zonal to any zonal communication within one zonal ring with at least two alternate paths from each zonal to adjacent zonal rings of other districts

The bidder solution should have capability to run services from any zonal to any other zonal in another district anywhere across the state at optical level.

The bidder solution should have inline OTDR functionality in every node with integration with the fault management functionalities of node.

The bidder solution should be built with WSON/ASON to provide the maximum protection for the services by making using of any of the available fibre paths to protect the traffic.

Bidders can reuse the existing NCS 2006 chassis in the APSFL network. or bidder may propose extra chassis for supporting the requirements or can propose completely different chassis in addition to the existing ones or completely provide a new vendor solution all together meeting all the existing and the new requirements mentioned as part of this RFP

The bidder solution should have to factor in all the software, licenses and hardware (including the client cards) required to support capacity at the DHQs, DCs and Zonals.

The bidder solution should have control and forwarding parts separated (autonomous) and any control plane failure should not affect the forwarding part.

The bidder solution should make sure that at OEM takes the ownership of end-to-end implementation of the solution by engaging their services team.

The bidder should consider all the costs associated with redesigning, planning optimizing the existing service design and implementation and integrations with the existing APSFL network.

The bidder solution should make sure that at OEM deploys 1 Network planner and 3 Network engineers during maintenance and support period at APSFL premises for handling all the updates and changes in the network.

The bidder should provide comprehensive network and services design and the necessary tools for planning and managing the services in the network and to monitor the service quality also.

Bidder is responsible to provide equipments for District & Zonal Network along with racks and required accessories such as PDU, Power cables, optical patch chords, fiber cable managers etc. In case of Zonal nodes where it was asked to support 65 degrees, if the equipment doesn't support 65 degrees operating temperature, bidder has to provide racks with required air conditioning to support 65 degrees operating temperature and necessary capacity of UPS and batteries to support the required backup capacity.

Technical Requirements

2.2.1 General Requirements

1. Network shall be intended to design and implemented in such a manner that it can maintain 99.999% network availability, based on physical transport media availability.
2. Proposed Network shall be scalable as per future requirement at Core Layer (DHQ to NOC DC&DR).
3. The equipment shall be fully compliant with ITU-T G.709 and ITU-T G.798.
4. The equipment should implement synchronous multiplexing at ODUk/VC level and Ethernet synchronous.
5. The NMS of the equipment should be web based and must support OTN, DWDM transmission equipment and the IP/MPLS network infrastructure to enable end to end provisioning and monitoring of the services running across the infrastructure.
6. The equipment should support the implementation of GMPLS (RFC 3945) and ASON (ITU-T G.8080).
7. Wavelength Grid and DWDM/OTN system should be as defined in ITU-T recommendation G.694.1, G.694.2.
8. It shall support fiber fault monitor by in line or embedded OTDR without any additional instrument.
9. It shall support online measure length and loss of fiber, it must not affect the service when measuring.
10. The supplier shall provide common parts of the chassis are redundant i.e. power supply redundancy, switch fabric redundancy (if any), shelf-controller redundancy and hitless switchover and hitless forwarding.
11. Network shall support insertion, replacement and removal of modules whilst the equipment is powered up without affecting traffic and / or damaging any module.
12. Equipment shall be based on modular chassis architectures, any service cards in any slots.
13. The supplier equipment shall provide indications on each individual module to indicate a failure of the module. The equipment shall also have an alarm display showing at least major and minor summary alarms.
14. Redundancy shall be available at board level, port level within the same multi-port line card.
15. The line interfaces should support the tuning of the carrier frequency or pluggable optical module on all the working channels defined in ITU-T Recommendation G.694.1.
16. SDH/OTN/Packet traffic should be aggregated into the same lambda after timeslot adaption to different ODUk channel and ODUk multiplexing.
17. The solution shall support 400g transmissions over G.652, G.653 and G.655 LEAF fibre.
18. The Proposed equipment must follow the guidelines of ETSI standards.
19. The Supplier shall state their compliance with regards to:
 - IEC 60825 (Optical Safety):
 - ETSI 300-019-2-3 (Climatic):
 - ETSI 300-019-2-2 (Transport):
 - ETSI 300-019-2-1 (Storage):
 - IEC 60950 Safety of Information Technology equipment
 - EN 300-386-2000 Electromagnetic compatibility and Radio spectrum Matters (ERM), telecommunication network equipment, EMC requirements.

- ETS 300-753 Acoustic noise emitted by telecommunications equipment.
20. 100G Span Budget – The system shall be able to support mixed operation of 10G/100G line rates sharing the same mux/de-mux hardware as well as be upgradeable in service (without traffic interruption) to carry 100 Gbit/s channels.
 21. The offered equipment shall support other service, such as STM-1/4/16, GE/FE, FC, FICON, ESCON, FDDI, SDI accessed by one tributary card, multiplexed into OTU2 / OTU4. The offered system shall support any-rate services such as STM64/OTU-2/10GbE, STM-1/4/16, GE/FE, FC, FICON, ESCON, FDDI, multiplexed into one OTU 2 / OTU4 channel.
 22. The 100G line card shall support any mixture of ODUk (K=0,1,2,2e,3,4) granular multiplexing into ODU4.
 23. The offered system shall support built-in OSNR, CD, PMD and optical monitoring for 100G channel (for example, power).
 24. For the 100G OTN switch function, traffic should be groomed either by cross connection cards/cross connect on OTN card, and backplane, should not by bridge/auxiliary cards or external pigtailed.
 25. The network shall support mapping 10GE LAN PHY to ODU2/4.
 26. The network shall support the clock transparency to Synchronous Ethernet PHY (SyncE) GE interfaces.
 27. The equipment shall also support the Ethernet service L2 aggregation of FE/GE/10GE/100GE, and then mapped into ODUk(k=0,1,2,3,4,flex) to save the bandwidth.
 28. Supplied equipment shall have functionality of hybrid (ODUk/PKT/VC) Unified switching card and line card at OTN Electrical layer.
 29. District Headquarter shall have 2 ports of 100 G client available from day one. It shall have capability to upgradable 4 port 100 G client ports.
 30. Zonal Headquarter shall have 2 port of 100 G client available from day one, It shall have capability to upgradable 4 port 100 G client ports.
 31. Supplied Equipment shall support at District level & Zonal level 0-45 degree C, considering Bidder shall provide Smart Racks for all zonal nodes with air conditioning to meet the temperature requirement.
 32. Offered equipment should support as capability to expand 400 G single lambda in future.
 33. OTN Capacity requirements:
 - 33.1. For L1 OTN services: Minimum 10 ports with flexibility to support any of the STM-1/4/16/64, 1/10G.2. from day 1 and future expansion in same supplied card up to 20 ports by inserting SFP only.
 - 33.2. For L2 packet services: Minimum 10 port with 1/10G accessible from day 1 and future expansion in same supplied card up to 20 ports by inserting SFP only.
 - 33.3. At each zonal node, bidder has to provide client ports for access of L1 and L2 services based on the above.
 - 33.4. At each DHQ, bidder has to provide at least 20x10G client interface card along with the required SFPs preloaded from day 1 to add/drop the capacity towards the primary and secondary NOCs.
 34. DHQ to NOC Bandwidth of 200G need to be distributed as : Dedicated 100G bandwidth with ASON protection (Switch within 50ms) for each of the two NOC(DC) location.

35. District Headquarter Ring shall provide 400G sharing bandwidth.
36. All the supplied DWDM/OTN nodes should support a SDN control plane for future integration with a external controller (or) Service orchestration platform.

1. Grooming/Switching Requirements

1. The supplier shall detail the capacity of the integrated OTN switch, its granularity, and types of supported OTN tributary /lines cards (O-E-O) used for sub-lambda grooming and aggregation as well as their tune ability support.
2. The Equipment should support 6 level of TCM for transmission quality monitoring and fault locating.
3. The sub-wavelength cross connect fabric shall be based on ODUk(k=0,1,2,flex).
4. SDH/OTN/Packet traffic should be aggregated into the same lambda after timeslot adaption to different ODUk channel and ODUk multiplexing.
5. Solution shall support STM-1, STM-4, STM-16, STM-64 ports should be structured in VC-4 based on ITU-T G.707 recommendation.
6. Equipment shall support STM-64 interfaces with ITU-T G.691 recommendation.
7. Solution shall support STM-1 optical ports with removable SFP modules based on ITU-T G.957 recommendation.
8. Solution shall support STM-4 optical ports with removable SFP modules based on ITU-T G.957 recommendation.
9. Solution shall support STM-1/4 optical ports configurable with removable SFP modules based on ITU-T G.957 recommendation.
10. Solution shall support STM-16 optical ports with SFP modules based on ITU-T G.957 recommendation

2. Service Requirements

1. The equipment shall support L2 electrical layer switching based on VLAN and MAC Address.
2. The equipment should comply to CE2.0 for E-LINE (EPL and EVPL).
3. The equipment should comply to CE2.0 for E-LAN (EP-LAN and EVP-LAN).
4. The equipment should comply to CE2.0 for E-TREE (EP-Tree, EVP-Tree)
5. The equipment should comply to CE2.0 for E-ACCESS (Access EPL, Access EVPL)
6. A Port can be configured to support service multiplexing (VLAN based). Precise the segregation fields (E.g. @C-VLAN, S-VLAN....).
7. EVPL service shall support C-VLAN ID preservation/translation.
8. The equipment must support flexible VLAN tag handling (inner/outer pop, push, swap, pop-swap, push-swap, swap-swap)
9. Multicast service with IGMP Snooping v3 should be supported.
10. The supplier shall detail end to end QOS for L2 switch including CAR, COS, 802.1q tag-based traffic
11. The equipment shall support the Ethernet service aggregation from GE to 10GE/100GE, 10GE, 100GE.
12. The equipment can support packet frame with 9600 bytes (Jumbo frame).
13. The equipment should support RMON.
14. The equipment shall support Ethernet mapping into ODUk/Lambda/Packet.
15. The equipment shall support mapping packet frames, VCs and other service carried by OTN to different sub-wavelength in one lambda.
16. The NMS system should support end-to-end Ethernet service provisioning. The service types must include EPL, EVPL, EPLAN, EVPLAN, both end service type may be different.

17. The NMS system should support end-to-end Ethernet service troubleshooting.

3. Protection Requirements

1. The Proposed Network design shall describe in detail (with diagrams) the available network level protection schemes at the optical layer (OMS, OCh) with regards to 1+1 SNC protection and 1+1 optical line protection detailing the modules used to achieve such a protection, the switching criteria, the protection range (i.e. OTU traffic module, OCh, line fiber) as well as the protection switching times.
2. The network design shall describe detailed protection schemes and switching times for a ring or meshed structure considering data traffic as a client interface. Moreover the design shall indicate if any of those modules are single points of failures (for example if the working and protection Transponder pair can be housed in different sub-racks).
3. The system must support ODUk SNC/N and SNC/I protection.
4. For the ODUk SNC 1+1 protection, it should be possible to configure a hold-off timer as specified in ITU-T Rec. G.798.
5. The equipment should support ODUk network restoration.
6. The equipment should implement OCh protection switching mechanisms.
7. Network shall be available and switch as per the ITU T standard until fiber path is available.
8. The equipment shall support WSON / ASON from day one with all required software and hardware

4. Ethernet L2 Feature Requirements

1. The solution shall support LAG (Link Aggregation Group) which can protect port with LACP (Link Aggregation Control Protocol) applied for.
2. The solution shall support DLAG (Distributed Link Aggregation Group) which can protect inter-board port with LACP (Link Aggregation Control Protocol) applied.
3. The transmission system shall give alarm or indication to router/switch to stop transmission/packet
4. forwarding on FE/GE/10GE/100GE ports of transmission Ethernet card, if there is link down between transmission media due to fiber cut or some fault.
5. Linear protection bi-directional switching in 1:1 architecture must be supported.
6. Automatic switchover between working and protecting and vice versa shall be executed less than 50 ms.
7. LSP and PW protection must be provided.
8. Revertive operation must be provided.
9. Non-revertive operation must be provided.
10. Lockout of protection forced switch and manual switch commands shall be supported.
11. The equipment should have the fault notification function in order to notify the external terminal equipment connecting to downstream system of fault occurred on the Network.
12. Performing link-down or optical signal shutdown at the port accommodating a UNI logical immediately.

5. Switching Fabric Requirements

1. The equipment will be equipped with one centralized fabric that performs connections at ODUk(=0, 1, 2, 3, 4, flex) level.
2. The switching fabric should be strictly non-blocking for all the implemented cross connections.
3. The switching fabric should be hot backup.
4. The equipment control and communication unit should be hot backup.

5. The switching fabric should be able to make cross connections driven by EMS/NMS, control plane and resilient mechanisms.
6. Supplied Equipment switching capacity should not be less than 5 Terabytes in day 1 across the network (District & Zonal Equipments)
7. The equipment shall provide an OCh switching fabric.
8. The OCh switching fabric should be strictly non-blocking for all implemented types of cross-connections.
9. The OCh switching fabric should be able to make cross connections driven by EMS/NMS, control plane and resilient mechanisms.
10. The OCh switching should support Directionless and Colour less configuration and the vendor should depict the configuration with schematic diagram.

6. Synchronization Requirements

1. The equipment must support clock recovery from STM-1/4/16/64 interface.
2. The equipment must support clock recovery from GE(GFP-T)/GE/10GE LAN/40GE/100GE interface.
3. The equipment shall support at least two 2MHz interface for external synchronization input and output in conformity with G.703 and G.704 recommendations.
4. The equipment shall support at least two 2Mbit/s interface for external synchronization input and output in conformity with G.703 and G.704 recommendations.
5. The equipment shall support at least two inputs & outputs interfaces for IEEE 1588V2, please indicate the detail of time synchronization including electrical specification, networking, etc.

7. WSON/ASON Requirements

1. ASON/WSON should support the peer mode or overlay mode.
2. ASON/WSON should support the 80 channel system.
3. ASON/GMPLS should support the E-NNI.
4. ASON/GMPLS should support the I-NNI
5. The ODUk electrical-layer ASON/Optical layer WSON supports different kind of services so that Purchaser can get 99.999% network availability till fiber path is available

8. Network Management Requirements

1. The proposed network management should support end to end automated service provisioning, monitoring control of all the network elements that are supplied as part of this RFP
2. The proposed NMS should have open integration interfaces on both southbound and northbound to integrate with external OSS/BSS and other provisioning systems. REST API is the bare minimum integration that should be supported.
3. NMS shall provide end-to-end visualization of wavelength paths
4. NMS shall provide end-to-end display of optical power measurements
5. NMS shall provide for details for end-to-end wavelength channel provisioning and automated wavelength channel restoration
6. NMS must support user-friendly GUI and easy point & click operations.
7. NMS should support quicker end-to-end provisioning of multi-service, including WDM circuit, OTN link, L2/L3 service, SDH circuit, Ethernet circuit, and wavelength transport.
8. NMS must support Ethernet OAM standards such as Y.1731,
9. The NMS shall support remote downloading of all types of software and firmware required by all equipment.

10. The system shall support up-gradation of the software version preloaded in the system without loss of traffic or configuration. System shall allow revert back to the previous version of the software without loss of traffic or configuration.
11. The NMS should have the capability of auto discovery of new NEs
12. NMS shall provide the inventory details of all systems in the network up to card and SFP/XFP level with simple operation.
13. NMS shall have report generation capacity such as Number of configured WDM circuits, OTN circuits, L2/L3 circuits, SDH circuits, Ethernet paths, used and unused capacity of each Network Element etc.
14. NMS shall provide Comprehensive network map (geographic and synoptic) of all the managed elements with a sophisticated alarm and traffic status display, real time alarm and traffic monitoring and giving a full access to all NE technical management features through a user friendly interface.
15. The NMS solution should be a web based application which should be scalable to support at least 500 DWDM and OTN network elements. The bidder has to factor in all the hardware and licensing costs associated for supporting the same with high availability across both the NOCs.
16. The NMS solution should support comprehensive Fault and Performance management functionalities with the fault status visible on the topology views of NMS
17. The supplier shall describe the support for equipment monitoring with regards to analogue monitoring (for example, frequency/power/OSNR per channel) for 10G/100G/200G system, error monitoring (i.e. Pre-FEC , Post FEC alarms, Degraded BER, Excessive BER, etc), Loopbacks (client/WDM side) and alarms, generated after reaching different FEC correction thresholds.
18. The Equipments shall support performance monitoring (as applicable to its offered 10G/40G/100G Transponder /Muxponders), with regards to the following layers:

OCh layer (ODUk/OTUk) with particular reference to post FEC error detection and Tandem connection monitoring (TCM) support.

Data layer with particular reference to:

- 8B/10B violation counters.
- Ethernet performance counts according to RFC 2819 (RMON) as snapshots.
- Historic performance log [Current and history counters (15m/24H)].
- Ethernet performance alarms.
- Built-in Optical Spectrum Analyzer solution.
- The proposed equipment should support rerouting based on latency.
- The Equipment shall support built-in automatic alarm when fiber degrade, include connector, splice point.
- The equipment shall support in-built E2E 10G/100G/200G OSNR report , monitor and optimization automatically in-service which will not cause the interruption of service and the OSNR monitoring precision shall be within +/-1dB.
- The equipment proposed shall support E2E service latency measurement.

3.3 Interface Requirements

The equipment shall provide following services:

3.3.1 TDM :

- STM-1/OC-3 : ITU-T G.957 I-1.1 , L-1.1, L-1.2
- STM-4/OC-12: ITU-T G.957 S-4.1 , L-4.1, L-4.2
- STM-16/OC-48:ITU-T G.957 I-16 , S-16.1,L-16.1, L-16.2
- STM-64/OC-192:ITU-T G.691 I-64.1, S-64.2b

3.3.2 Gigabit Ethernet:

- IEEE802.3z 1000Base-SX, 1000Base-LX, 1000Base-ZX, 1000Base-T
- 10Gigabit Ethernet :
- IEEE802.3ae 10GBase-SR , 10GBase-LR, 10GBase-ER, 10GBase-ZR
- 100Gigabit Ethernet LAN PHY (100GBASE-R) :
- IEEE802.3ba 100GBase-LR4

3.3.3 OTN:

The following standards should be supported:

- OTU1
- ITU-T G.709 OTU2
- ITU-T OTU2/G.Sup43 OTU2e (Configurable)
- ITU-T G.709 OTU3
- ITU-T G.709 OTU4
- ITU-T G.709 OTU2C

Annexure II – Price Bid

(To be submitted by Bidder on original letterhead)

To Date:

The Managing Director,
Andhra Pradesh State FiberNet
Limited, 3rd Floor, NTR
Administrative Block, Pandit Nehru
Bus Station,
NH – 65, Vijayawada – 520013

Subject: Supply, Installation and Commissioning of DWDM Network Upgrade Equipment for AP Fiber Grid

Ref: APSFL/OLA/284-2/2018, Dated 02/03/2019

Price Bid for Solution:

S No	Item description	Total Price
1	Complete End-to-End Solution for 13 Districts with required DWDM & OTN nodes along with required line amplifiers (A)	
2	Complete End-to-End Solution for 52 Zonals with required DWDM & OTN nodes along with required line amplifiers (B)	
Grand Total in INR (A+B)		
Grand Total in INR in words		

Price Bid for components:

S No	Item description	Quantity	Unit Price	Total Price
1	STM-1: 10km	100		
	STM-1: 40km	65		
	STM-1: 80km	10		
2	STM-4: 10Km	10		
	STM-4: 40km	10		
	STM-4: 80km	10		
3	STM-16: 10km	10		
	STM-16: 40km	10		
	STM-16: 80km	10		
4	STM-64: 10Km	10		
	STM-64: 40km	10		
	STM-64: 80km	10		
5	SFP 1GE: 10km	10		
	SFP 1GE: 40km	10		
	SFP 1GE: 80km	10		
6	SFP 10GE: 300m	100		

	SFP 10GE: 10Km	10		
	SFP 10GE: 40Km	10		
	SFP 10GE: 80Km	10		
7	QSFP 100 G: 100 Mtr	130		
8	QSFP 100 G: 10Km	10		
9	QSFP 100 G: 40Km	10		

Note: Bidder need to give a detailed Equipment level/Card level and component level pricing for the overall solution being quoted as part of the price bid.

Annexure III – Consortium Agreement Format

DRAFT MEMORANDUM OF UNDERSTANDING EXECUTED BY MEMBERS OF THE CONSORTIUM

[On Non-judicial stamp paper of Indian Rupees 100 duly attested by notary public]

This Memorandum of Understanding (MoU) entered into this day of [Date] [Month] 2019 at [Place] among _____ (hereinafter referred to as " ") and having office at [Address], India, as Party of the First Part and _____ (hereinafter referred as " ") and having office at [Address], as Party of the Second Part and _____ (hereinafter referred as " ") and having office at [Address], as Party of the Third Part.

The parties are individually referred to as Party and collectively as Parties.

WHEREAS Andhra Pradesh State FiberNet Limited has issued a Request for Proposal dated [Date] (RFP) from the applicants interested in [RFP Name]:

AND WHEREAS the parties have had discussions for formation of a consortium for bidding for the said project and have reached an understanding on the following points with respect to the parties' rights and obligations towards each other and their working relationship.

AS MUTUAL UNDERSTANDING OF THE PARTIES, IT IS HEREBY AGREED AND DECLARED AS FOLLOWS:

- i. The purpose of this Agreement is to define the principles of collaboration among the parties to: Submit a response jointly to bid for the tender "[RFP Name]" as a consortium.
 - a. Sign contract in case of award.
 - b. Provide and perform the supplies and services which would be ordered by the authority pursuant to the contract.
- ii. This agreement shall not be construed as establishing or giving effect to any legal entity such as, but not limited to, a company, a partnership, etc. It shall relate solely towards the authority for "[RFP Name]" for and related execution works to be performed pursuant to the contract and shall not extend to any other activities.
- iii. The parties shall be jointly and severally responsible and bound towards the authority for the performance of the works in accordance with the terms and conditions of the tender document, and contract.
- iv. _____ (Name of party) shall act as Lead Partner of the consortium. As such, it shall act as the coordinator of the party's combined activities and shall carry out the following functions:
 - a. To ensure the technical, commercial and administrative co-ordination of the work package.
 - b. To lead the contract negotiations of the work package with the authority.
 - c. The lead partner is authorized to receive instructions and incur liabilities for and on behalf of all parties.
 - d. In case of an award, act as channel of communication between the authority and the

parties to execute the Contract

- v. That the parties shall carry out all the responsibilities of the project agreement.
- vi. That the broad roles and the responsibilities of each party at each stage of the bidding shall be as below:

Party A:

Party B:

Party C:

- vii. That the parties affirm that they shall implement the project in good faith and shall take all necessary steps to see the project through expeditiously.
- viii. That this MoU shall be governed in accordance with the laws of India and courts in Andhra Pradesh shall have exclusive jurisdiction to adjudicate disputes arising from the terms herein.

In witness whereof, the parties affirm that the information provided is accurate and true and have caused this MoU duly executed on the date and year above mentioned.

(Party of the first part)

(Party of the second part)

(Party of the third part)

Witness:

i. _____

ii. _____