Addendum & Corrigendum-1

Request for Proposal

For

Creation of OFC Network for BRTS Corridor and other important SMC Locations

Volume 1-Terms of Reference

RFP No.: SSCDL-ConnectedSurat-OFC-RFP-01-2017

Last date for Online Price Bid Submission: 09.06.2017

Invited by
Surat Smart City Development limited
115, Smart City Cell, Surat Municipal Corporation,
Muglisara, Main Road, Surat - 395003, Gujarat.

Surat Smart City Development Limited

ADDENDUM AND CORRIGENDUM-1

RFP No.: SSCDL-ConnectedSurat-OFC-RFP-01-2017

The Bidders are requested to take note of the following changes made in the RFP documents, which are to be taken in to account while submitting the RFP. They shall be presumed to have done so and submitted the RFP accordingly.

- This Addendum and Corrigendum shall be the part of the RFP documents.
- All items specified in this Addendum and Corrigendum supersede relevant items to that effect as provided in the original RFP documents. All other specifications, terms and conditions of the original RFP document shall remain unchanged.
- Bidders shall read and consider following points, which shall be a part of the RFP documents.
- ***The queries raised and given by bidders, but the clarifications are not made in this Addendum and Corrigendum shall be considered to remain unchanged as per the terms and conditions mentioned in the original RFP documents.***
- ***Please read above changes across the RFP for both Volume 1 and Volume 2 as applicable. The above changes is also valid for draft Master Service Agreement mentioned in RFP Volume 1***

<table>
<tr><th>#</th><th>Tender Reference</th><th>Existing Clause</th><th>Amended / New Clause</th></tr>
<tr><td>1.</td><td>Notice Inviting Express of Interest</td><td>
Surat Smart City Development Limited (SSCDL)
115, Smart City Cell, Surat Municipal Corporation - HQ,
Muglisara, Main Road, Surat - 395003, Gujarat.
Notice Inviting RFP for “Creation of OFC Network for BRTS Corridor and Other Important SMC Locations” [SSCDL-ConnectedSurat-OFC-RFP-01-2017]
<table>
<tr><td>Online Price Bid End Date</td><td>• To be submitted online only on https://smc.nprocure.com on or before 26.05.2017 up to 18:00 hrs.</td></tr>
<tr><td>Technical Bid Submission (in Hard Copy) along with EMD & Bid fee</td><td>• In sealed envelope strictly by RPAD/Postal Speed Post on or before 31.05.2017 up to 18:00 hrs. to the Chief Accounts, Surat Municipal Corporation, Muglisara, Surat – 395003</td></tr>
</table>
The right to accept/reject any or all bid(s) received is reserved without assigning any reason thereof.

GM (IT)
Surat Smart City Development Ltd
</td><td>
Surat Smart City Development Limited (SSCDL)
115, Smart City Cell, Surat Municipal Corporation - HQ,
Muglisara, Main Road, Surat - 395003, Gujarat.
Notice Inviting RFP for “Creation of OFC Network for BRTS Corridor and Other Important SMC Locations” [SSCDL-ConnectedSurat-OFC-RFP-01-2017]
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<tr><td>Technical Bid Submission (in Hard Copy) along with EMD & Bid fee</td><td>• In sealed envelope strictly by RPAD/Postal Speed Post on or before 14.06.2017 up to 18:00 hrs. to the Chief Accounts, Surat Municipal Corporation, Muglisara, Surat – 395003</td></tr>
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<tr><td>2.</td><td>Section 6: Pre-Qualification Criteria</td><td>
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<tr><th>#</th><th>Pre-Qualification Criteria</th></tr>
<tr><td>6</td><td>Bidder or any member of consortium should have executed project(s) in India whereby 100 WAN nodes are connected and maintained with active components in last 7 years from the date of issuance of this RFP
Note:
1.For a 50% or above subsidiary, parent company experience will be considered for evaluation purposes
2.The executed project is defined as those projects where 100 WAN nodes have been connected and gone live in last 7 years from the date of issuance of this RFP. Moreover, O&M should have been completed or on-going (minimum 6 months) in last 7 years from the date of issuance of this RFP.</td></tr>
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Note:
1.For Telecom nodes the experience of connecting BTS towers/POPs will only be considered for evaluation
2. .For a 50% or above subsidiary, parent company experience will be considered for evaluation purposes
3. The executed project is defined as those projects where 100 WAN nodes have been connected and gone live in last 7 years from the date of issuance of this RFP. Moreover, O&M should have been completed or on-going (minimum 6 months) in last 7 years from the date of issuance of this RFP.</td></tr>
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<tr><td></td><td></td><td></td><td>The proof of documents required are as per RFP. There is no change in the same</td></tr>
<tr><td>3.</td><td>EMD</td><td>Additional Information for BG Creation</td><td>
<table>
<tr><td></td><td></td></tr>
<tr><td>Name of Beneficiary:</td><td>Surat Smart City Development Ltd</td></tr>
<tr><td>Name of Bank:</td><td>State Bank of India</td></tr>
<tr><td>Bank address:</td><td>Nanpura, Surat Branch</td></tr>
<tr><td>Bank Account No:</td><td>35661186460</td></tr>
<tr><td>IFSC CODE:</td><td>SBIN0001388</td></tr>
<tr><td>MICR CODE:</td><td>395002004</td></tr>
<tr><td>BRANCH CODE:</td><td>1388</td></tr>
</table>
</td></tr>
<tr><td>4.</td><td>Technical Evaluation Criteria – TEC 5</td><td>

If bidder (Any member of consortium who has been allocated responsibility of the component as per responsibility matrix) has executed project(s) in India whereby 100 WAN nodes are connected and maintained with active components in last 7 years from the date of issuance of this RFP then the bidder will get 70 marks.
For every additional project(s) in India whereby 50 WAN nodes are connected and maintained with active components in last 7 years bidder will get 10 marks, subject to a maximum of 100 marks.

<table>
<tr><th>Number of WAN Nodes</th><th>Marks</th></tr>
<tr><td>= > 250 WAN nodes</td><td>100</td></tr>
<tr><td>= 200 WAN nodes</td><td>90</td></tr>
<tr><td>= 150 WAN nodes</td><td>80</td></tr>
<tr><td>= 100 WAN nodes</td><td>70</td></tr>
</table>

The executed project is defined as those projects where WAN nodes have been connected and gone live in last 7 years from the date of issuance of this RFP. Moreover, O&M should have been completed or on-going (minimum 6 months) in last 7 years from the date of issuance of this RFP.
Copy of Work order / Contract and Completion Certificate from client is required to be submitted
In case project is on-going then the Certificate to this effect from the client on client's letter head is required to be submitted

Maximum marks: 100
</td><td>

If bidder (Any member of consortium who has been allocated responsibility of the component as per responsibility matrix) has executed project(s) in India whereby 100 WAN / telecom nodes are connected and maintained with active components in last 7 years from the date of issuance of this RFP then the bidder will get 70 marks.
For every additional project(s) in India whereby 50 WAN / telecom nodes are connected and maintained with active components in last 7 years bidder will get 10 marks, subject to a maximum of 100 marks.

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▪ In case project is on-going then the Certificate to this effect from the client on client's letter head is required to be submitted
Maximum marks: 100</td></tr>
<tr><td>5.</td><td>Technical Evaluation Criteria – TEC 7</td><td>▪ If the bidder (Lead bidder in case of Consortium) has at least 100 FTE (full time employees) on the payroll of organization working on telecom / optic fiber / network projects then the bidder will get 70 marks
▪ For every additional 50 FTEs the bidder will get additional 10 marks subject to maximum of 100 marks.
<table>
<tr><th>Number of FTE</th><th>Marks</th></tr>
<tr><td>> 200 FTE</td><td>100</td></tr>
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Maximum marks: 100</td><td>▪ "If the bidder (Lead Bidder and/or Consortium Partner) has at least 100 aggregated FTE (full time employees) on the payroll of organization working on telecom / optic fiber / network projects then the bidder will get 70 marks
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Maximum marks: 100</td></tr>
<tr><td>6.</td><td>Evaluation of Commercial Bid</td><td>▪ Standard software for example 'Excel', 'or any other spreadsheet will be used for NPV analysis</td><td>▪ Standard software for example 'Excel', 'or any other spreadsheet will be used for NPV analysis by SMC / SSCDL. Further, a separate excel with formulas will also be uploaded by SSCDL / SMC where bidder can use it for their calculations and verification if required.</td></tr>
<tr><td>7.</td><td>OEM / Implementation Partner Participation Criteria</td><td>
<table>
<tr><th>Component</th><th>Selection criteria for the OEM</th></tr>
<tr><td colspan="2">IT Infrastructure Components</td></tr>
<tr><td>Other Switches Routers, UTMs</td><td>• OEMs who are present in the latest Magic Quadrant (challengers or leaders) by Gartner.</td></tr>
<tr><td>Servers</td><td>• OEMs who are present in the latest Magic Quadrant (challengers or leaders) by Gartner.</td></tr>
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Additional OEM / Brand Compliance requirement</td><td>
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<tr><td>Other Switches Routers, UTMs</td><td>• OEMs who are present in the latest Magic Quadrant (challengers or leaders) by Gartner or are amongst the top 5 for World-wide Market share in terms of Revenue as per IDC</td></tr>
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</td></tr>
</table>

#	Tender Reference	Existing Clause	Amended / New Clause
		With regards to above table, OEMs will certify the installation base and the project experience. This certificate shall be issued through the **Global Headquarters** and attested by the Indian office. Moreover, the agency will submit Gartner Magic Quadrant report.	**World-wide Market share in terms of Revenue as per IDC** **Additional OEM / Brand Compliance requirement** With regards to above table, OEMs will certify the installation base and the project experience. This certificate shall be issued through the **Global Headquarters** and attested by the Indian office. **Moreover, the agency will submit latest Gartner Magic Quadrant / IDC report as document proof.**
8.	7.26 Evaluation of Commercial Bids and Selection Method	The NPV will be calculate during the formula below: **NPV (Cb) = Co + C1/(1+r)¹ + C2/(1+r)² + C3/(1+r)³ + C4/(1+r)⁴ + C5/(1+r)⁵ .....+ Cn/(1+r)ⁿ** Where, Co ... Cn are the yearly cash outflows as illustrated below - Co is the sub-total for Services Provided During Implementation Phase - C1 is defined as: (Cost of Operations and Maintenance Services for the 1st year after "Go-Live") - C2 is defined as: (Cost of Operations and Maintenance Services for the 2nd year after "Go-Live") - Cn is defined as: (Cost of Operations and Maintenance Services for the Nth year after "Go-Live") r is the annual discounting rate(9%) as specified in Para (2) above	The NPV will be calculate during the formula below: **NPV (Cb) = Co + C1/(1+r)¹ + C2/(1+r)² + C3/(1+r)³ + C4/(1+r)⁴ + C5/(1+r)⁵ .....+ C21/(1+r)ⁿ** Where, Co ... C21 are the yearly cash outflows as illustrated below - Co is the sub-total for Services Provided During Implementation Phase - C1 is defined as: (Cost of Operations and Maintenance Services for the 1st year after "Go-Live")-(Absolute value of Committed Revenue quoted for 1st Year) - C2 is defined as: (Cost of Operations and Maintenance Services for the 2nd year after "Go-Live") ")-(Absolute value of Committed Revenue quoted for 2nd Year) - .....C7 is defined as: (Cost of Operations and Maintenance Services for the 7th year after "Go-Live") ")-(Absolute value of Committed Revenue quoted for 7th Year) - C8 is defined as: Numeric value Zero-(Absolute value of Committed Revenue quoted for 8th Year)

<table>
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<tr><td></td><td></td><td></td><td>- C9 is defined as: Numeric Value Zero-(Absolute value of Committed Revenue quoted for 9th Year)

.....C21 is defined as: Numeric Value Zero-(Absolute value of Committed Revenue quoted for 21st Year)</td></tr>
<tr><td>9.</td><td>Commercial Bids and Selection Method</td><td>6. The bidder achieving the L1 price will be invited for negotiations for awarding the contract. In case of a tie where two or more bidders achieve the same price, the bidder with the higher technical score will be invited for negotiations and awarding the contract. In case of a tie on the technical scores and L1 price, the Cb will be calculated to the third place of decimal and the bidder with lesser Cb will be invited for negotiations and awarding of the contract.</td><td>6. The bidder achieving the L1 price will be invited for negotiations for awarding the contract. In case of a tie where two or more bidders achieve the same price, the bidder with the higher technical score will be invited for negotiations and awarding the contract. In case of a tie on the technical scores and L1 price, the Cb will be calculated to the fifth place of decimal and the bidder with lesser Cb will be invited for negotiations and awarding of the contract.</td></tr>
<tr><td>10</td><td>8.1 Measurement of SLA</td><td>The matrix specifies three levels of performance, namely,
a. The SI will get 100% of the Contracted value if all the baseline performance metrics are compiled and the cumulative credit points are 100
b. The SI will get lesser payment in case of the lower performance</td><td>This clause stands deleted</td></tr>
<tr><td>11.</td><td>General Instructions on Preparation of the Technical Proposal</td><td>Addition</td><td>Business Model:
Bidder is required to define total no of ducts proposed in the RFP i.e. as per below table as part of their Technical proposal
<table>
<tr><th>Component</th><th>Proposed by Bidder (Yes or No)</th></tr>
<tr><td>1 duct for SMC network and 1 additional duct for Monetisation</td><td></td></tr>
<tr><td>1 duct for SMC network and 2 additional ducts for Monetisation</td><td></td></tr>
<tr><td>1 duct for SMC network and 3 additional ducts for Monetisation</td><td></td></tr>
</table></td></tr>
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#	Tender Reference	Existing Clause	Amended / New Clause
12	13.2 Minimum Activities for Network Implementation. Point 4,1	Placing of Single Lid Hand Holes cast-in-situ with size 1M (L)*1M(W)*1.2M(D), scope includes transportation, loading, unloading & excavation of pit for the hand-holes at an interval of every 200 Mtrs or wherever applicable for city limit, continuity of armour (in case of armour cable), PCC of 100 MM below handhole.	Placing of **single/ dual Lid Hand Holes** cast-in-situ with size 1M (L)*1M(W)*1.2M(D), scope includes transportation, loading, unloading & excavation of pit for the hand-holes at an interval of every 200 Mtrs or wherever applicable for city limit, continuity of armour (in case of armour cable), PCC of 100 MM below handhole.

9.2. Revised Business Model

SSCDL is keen to implement network solution of global standards, and ensure this initiative delivers value to the beneficiaries. SSCDL would also encourage monetization of this initiatives, in order to make the overall project a self-sustainable model.

SSCDL desires to lay additional duct across the BRTS corridor network to create a means for revenue generation through duct(s) leasing. SSCDL's commercial model for the project encourages the bidders to actively participate in creating the network for with SSCDL. The responsibility of monetizing the network will be with the selected vendor thus creating a win-win situation for all the stakeholders in the project – SSCDL, SMC, Selected Vendor, Citizens, Businesses, etc.

SSCDL proposes to have the following model to monetize the additional duct(s) for the period of 21 years.

#	Business Model	Ducts	Capex	Opex	Security Deposit for Road Digging	Restoration Charge	Annual Rental of Duct	Contract Period	Ownership
1.	OFC Network with 1 duct Leasing	Duct with SSCDL's Fiber	SSCDL	SSCDL	Waived Off	To be reimbursed by SMC	SSCDL	7 yr. O&M	SSCDL
		1st Duct	SSCDL	Bidder			Bidder	21 yr. Revenue Share	SSCDL
2.	OFC Network with 2 duct Leasing	2nd Duct Leasing	SSCDL	Bidder			Bidder	21 yr. Revenue Share	SSCDL
3.	OFC Network with 3 duct Leasing	3rd Duct Leasing	SSCDL	Bidder				21 yr. Revenue Share	SSCDL

Note:

i. The CAPEX for duct laying for SMC network as well as for monetization purpose will be borne by SMC/ SSCDL. However, any other active or passive components required for monetization components has to be done by the selected bidder on its own.

ii. PoP created under this project will be exclusively utilized for the purpose of this network. Selected bidder shall not be allowed to terminate fiber cable for monetization at any of the PoP.

iii. SI shall get the exclusive right and no other telecom operator will allow to layoff the Fiber in the same BRTS corridor subject to the Duct/Fiber is completely utilized and rental price is competitive offered by the SI. SMC/SSCDL has the authority/rights to revoke the exclusive rights in future in case if required.
iv. SSCDL/SMC will have right to negotiate the committed revenue quoted as part of monetization by the bidder and will have right to take decision regarding monetization.
v. In case SSCDL/SMC, desires to extend the existing network, the selected bidder will be required to execute the additional work as per the rate quoted in the price bid. However, if required, the revenue share for monetization of such additional network will be decided on mutual agreement.
vi. SSCDL/SMC will decide at the time of Commercial bid evaluation and choose the best suitable option in the interest of SSCDL/SMC.
vii. If SI proposes any further additional revenue streams during implementation (which are not identified at the time of bid submission), the project monitoring committee of SSCDL shall take review of such additional revenue streams before these are implemented by the successful bidder. For such additional revenue streams allowed, SI shall share 20% of the net revenue to SSCDL (net of taxes)

Clarification on RoW and Restoration Charges

1. Bidder is required to carry out complete process as per SMC guidelines including taking permission. SSCDL/SMC will provide necessary support to expedite the permission.
2. The security deposit required to be paid at the time of Road Digging Permission will be waived off by SMC.
3. The Road Reinstatement Charge (RI Charge) will be reimbursed on quarterly basis as per actuals on submission of bills.
4. In case of HDD, the Road Reinstatement Charges will be calculated considering the actual road that has been dug (the pit area).
5. For micro trenching bidder is required to undertake the restoration at his cost. No reimbursement will be made in this regard by SSCDL. Depth of cable using Micro trenching should be in compliance with the specification of the RFP.
6. Annual Rentals will be waived off by SMC for option 1 mentioned in the table above ***(refer Table of 9.2 " Revised Business Model")***
7. The SI shall inform all concerned authorities and obtain NOC or permissions as required before starting the excavation and Hand Hole construction works.
8. In case of the permission is required from any other authority apart from SMC, the bidder is required to coordinate. SMC/SSCDL will facilitate and provide necessary support to expedite the same
9. The restoration charges are as below:

#	Road Type	Rate per RMT (INR)
1.	Asphalt Road	710
2.	WBM Road	440
3.	Earth Road (Kuchcha Road)	50
4.	Footpath	890
5.	CC Road	900

The annual rental are as below:

#	Road Type	Rate per RMT (INR)
1.	For every road	20
2.	For road crossing	50

12.2 Revised Commercial Bid Format

12.2.1 Summary Estimation of Project

Bidder to specify the option for monetization as below

Options	Proposed by Bidder (Yes or No)
Option1: one duct for SMC network and one additional duct for Monetization	
Option2 : one duct for SMC network and two additional ducts for Monetization	
Option3: one duct for SMC network and three additional ducts for Monetization	

If Option 1 is considered by SMC / SSCDL for evaluation, the below summary estimation will be considered

Particulars	Value (INR)
Net Value for CAPEX (A1)	
NPV for OPEX (B1.1)	
NPV for Net Revenue to SSCDL (C1.1)	
NPV for Fibre Connectivity (without Taxes) = (A1+B1.1)-C1.1	
NPV for Fibre Connectivity	In words (Net Value)

If Option 2 is considered by SMC / SSCDL for evaluation, the below summary estimation will be considered

Particulars	Value (INR)
Net Value for CAPEX (A2)	
NPV for OPEX (B2.1)	
NPV for Net Revenue to SSCDL (C2.1)	
NPV for Fibre Connectivity (with2out Taxes) = (A2+B2.1)-C2.1	
NPV for Fibre Connectivity	In words (Net Value)

If Option 3 is considered by SMC / SSCDL for evaluation, the below summary estimation will be considered

Particulars	Value (INR)
Net Value for CAPEX (A3)	
NPV for OPEX (B3.1)	
NPV for Net Revenue to SSCDL (C3.1)	
NPV for Fibre Connectivity (without Taxes) = (A3+B3.1)-C3.1	
NPV for Fibre Connectivity	In words (Net Value)

Capex (A1) - For Option 1

#	Particulars	Total Net Amount (INR)	Total Taxes (INR)	Total Amount (INR)	Remarks
1	**Common CAPEX Components**				
1.1	Passive Components - Schedule I				Cost of Schedule 1A table
1.2	Active Components - Schedule II				Cost of Schedule II
Total Amount in INR					
Total Net Amount in INR (A1)					
Total Net Amount in words		**In words (Net Value)**			

Opex (B1) - For Option 1

#	Particulars	Total Net Amount (INR)	Total Taxes (INR)	Total Amount (INR)	NPV Value	Remarks
1.1	Passive Components - Schedule III					Cost of Schedule III table
1.2	Active Components - Schedule IV					Cost of Schedule IV
Total in INR						
Total NPV in INR(B1.1)						
Total NPV in Words (B1.1)		**In words**				

Capex (A2) - For Option 2

#	Particulars	Total Net Amount (INR)	Total Taxes (INR)	Total Amount (INR)	Remarks
1	**Common CAPEX Components**				
1.1	Passive Components - Schedule I				Cost of Schedule 1A table + Cost of Schedule IB table
1.2	Active Components - Schedule II				Cost of Schedule II
Total Amount in INR					
Total N2et Amount in INR (A2)					
Total Net Amount in words		**In words (Net Value)**			

Opex (B2)- For Option 2

#	Particulars	Total Net Amount (INR)	Total Taxes (INR)	Total Amount (INR)	NPV Value	Remarks
1.1	Passive Components - Schedule III					Cost of Schedule III table
1.2	Active Components - Schedule IV					Cost of Schedule IV
Total in INR						
Total NPV in INR(B2.1)						
Total NPV in Words (B2.1)		**In words**				

Capex (A3)- For Option 3

#	Particulars	Total Net Amount (INR)	Total Taxes (INR)	Total Amount (INR)	Remarks
1	**Common CAPEX Components**				
1.1	Passive Components - Schedule I				Cost of Schedule 1A table + Cost of Schedule IC table
1.2	Active Components - Schedule II				Cost of Schedule II
Total Amount in INR					
Total Net Amount in INR (A3)					
Total Net Amount in words		**In words (Net Value)**			

Opex (B3)- For Option 3

#	Particulars	Total Net Amount (INR)	Total Taxes (INR)	Total Amount (INR)	NPV Value	Remarks
1.1	Passive Components - Schedule III					Cost of Schedule III table
1.2	Active Components - Schedule IV					Cost of Schedule IV
Total in INR						
Total NPV in INR(B3.1)						
Total NPV in words (B3.1)		**In words**				

Rate Discovery for NOC Operator

#	Particulars	Rate for Y1 (INR)	Rate for Y2(INR)	Rate for Y3(INR)	Rate for Y4(INR)	Rate for Y5 (INR)	Rate for Y6 (INR)	Rate for Y7(INR)
1	NOC Operator (1 Qty)							

Note: The above rate will not be considered for L1 evaluation. SSCDL/ SMC will consider this rate in case of manpower augmentation is required for NOC operation. However, SSCDL / SMC reserves the right to negotiate the rate with the bidder.

Summary of Revenue Streams

Revenue Share (C1)

#	Particulars	Yr 1			Yr 2	...	Yr 21	Total committed revenue with SSCDL
		Estimated Revenue (INR)	% Committed share with SSCDL	Committed Revenue with SSCDL (Amount in INR)				(Amount in INR)
1	**Revenue Streams proposed by the Bidder**							
1.1	1 Duct Leasing							
Total Amount in INR (C1)								
NPV in INR (C1.1)								

NPV in INR (C1.1)	**In words**							

Revenue Share (C2)

#	Particulars	Yr 1			Yr 2	...	Yr 21	Total committed revenue with SSCDL
		Estimated Revenue (INR)	% Committed share with SSCDL	Committed Revenue with SSCDL (Amount in INR)				(Amount in INR)
1	**Revenue Streams proposed by the Bidder**							
1.1	2 Ducts Leasing							
Total Amount in INR (C2)								
NPV in INR (C2.1)								
NPV in INR (C2.1)	**In words**							

Revenue Share (C3)

#	Particulars	Yr 1			Yr 2	...	Yr 21	Total committed revenue with SSCDL
		Estimated Revenue (INR)	% Committed share with SSCDL	Committed Revenue with SSCDL (Amount in INR)				(Amount in INR)
1	**Revenue Streams proposed by the Bidder**							
1.1	3 Ducts Leasing							
Total Amount in INR (C3)								
NPV in INR (C3.1)								
NPV in INR (C3.1)	**In words**							

12.2.2 Schedule I

Schedule IA : Estimation of Supply Install, Testing and Commissioning (SITC) of Passive Components

#	Particulars	Measurement Unit	Quantity	Unit Price (INR)	Net Value(INR)	Taxes(INR)	Total(INR)
1	**Creation of OFC Network**						
1.1	Creation of 96 F (core) OFC Network for BRTS Corridor and other important SMC Locations for 36 Km road length or 46 Km of Fiber Length	Mtr	36,000				
1.2	Creation of 48 F (access) OFC Network for BRTS Corridor and other important SMC Locations for 82 Km road length or 102 Km of Fiber Length	Mtr	82,000				
1.3	Creation of 12 F (last mile) OFC Network for BRTS Corridor and other important SMC Locations for 6 Km of Fiber Length	Mtr	6,000				
1.4	Creation of 12 F (in building ducting) OFC Network for BRTS Corridor and other important SMC Locations for 4 Km of Fiber Length	Mtr	4,000				
1.5	Restoration of trench surface to its original conditional (RI Charge)	Lumpsum	1				
Total - Schedule I (INR)							

Note:
1. The above network is with 2 ducts (one duct for SMC network and one additional duct for Monetization). If bidder is proposing for additional ducts for monetization, then please quote as per table below - Schedule IB & Schedule IC respectively

2. The quantities mentioned are tentative in nature to arrive at L1 cost. The actual quantity may vary at the time of implementation. List of activities (not limited to) envisaged for Network implementation is provided in Annexure 13.4. Bidder is required to consider the same for commercial estimation

Schedule IB : Estimation of Supply Install, Testing and Commissioning (SITC) of Passive Components (with additional ducts)

#	Particulars	Measurement Unit	Quantity	Unit Price (INR)	Net Value(INR)	Taxes(INR)	Total(INR)
1	**1 Additional Duct Laying for monetization (1 SMC + 1 Monetization + 1 additional for Monetization)**						
1.1	SITC for Duct laying and all related accessories for Monetization	Mtr	128000				

Schedule IC : Estimation of Supply Install, Testing and Commissioning (SITC) of Passive Components (with additional ducts)

#	Particulars	Measurement Unit	Quantity	Unit Price (INR)	Net Value(INR)	Taxes(INR)	Total(INR)
1	**2 Additional Duct Laying for monetization (1 SMC + 1 Monetization + 2 additional for Monetization)**						
1.1	SITC for Duct laying and all related accessories for Monetization	Mtr	128000				

12.2.3 Schedule II

Schedule II : Estimation of Supply Install, Testing and Commissioning (SITC) of Active Components

#	Particulars	Measurement Unit	Quantity	Unit Price (INR)	Net Value(INR)	Taxes(INR)	Total(INR)
1	**Network Operation Center**						
1.1	Core Switch	Nos	2				
1.2	Core Router	Nos	2				
1.3	Internet Router	Nos	2				
1.4	Access Switch	Nos	2				
1.5	Next Generation Firewall / UTM	Nos	2				
1.6	Server with Operating System	Lot	1				
1.7	EMS	Lot	1				
1.8	NMS	Lot	1				
1.9	Helpdesk	Lot	1				
1.10	Remote Fiber Monitoring System	No	1				

1.11	Database software with license	Lot	1				
1.12	Antivirus License	Lot	1				
1.13	42 U Rack with accessories	No	4				
2	**PoP Locations**						
2.1	Mega POP/POP Switches	No	8				
2.2	Supply of Access Control System	Sets	3				
2.3	UPS	No	4				
2.4	Rack - 42U with accessories	Nos	8				
2.5	Rodent System	Nos	3				
3	**Access Locations**						
3.1	Indoor Switches	No	25				
3.2	UPS	No	25				
3.3	Rack - 9U with accessories	Nos	180				
Total - Schedule II (INR)							

Note: The quantities mentioned are tentative in nature to arrive at L1 cost. The actual quantity may vary at the time of implementation

12.2.4 Schedule III

Schedule III :O&M for Passive Components

#	Particulars	Measurement Unit	Y1	Y2	Y3	..Y7	Total Net Amount (INR)	Total Taxes (INR)	Total Amount (INR)
1	**Operation & Maintenance of below including all accessories and services for SMC Network (With 1 SMC duct only)**								
1.1	O&M of OFC Network for BRTS Corridor and other important SMC Locations for 128 km road length or 158 Km of Fiber Length including last mile connectivity	Mtr							

Total Amount in INR									
NPV in INR									

Note:

i. The above network is with 1 duct (one duct for SMC network). O & M for duct(s) of monetization shall be borne by bidder.
ii All components are with 3 years warranty, thus bidders are required to quote the O&M charges for the first three years accordingly.
iii The quantities mentioned are tentative in nature to arrive at L1 cost. The actual quantity may vary at the time of implementation.

12.2.5 Schedule IV

Schedule IV : O&M of Active Components

#	Particulars	Measurement Unit	Quantity	Y1	....Y7	Total Net Amount (INR)	Total Taxes (INR)	Total Amount (INR)
1	**Network Operation Center**							
1.1	Core Switch	Nos	2					
1.2	Core Router	Nos	2					
1.3	Internet Router	Nos	2					
1.4	Access Switch	Nos	2					
1.5	Next Generation Firewall / UTM	Nos	2					
1.6	Server with Operating System	Lot	1					
1.7	EMS	Lot	1					
1.8	NMS	Lot	1					
1.9	Helpdesk	Lot	1					
1.10	Remote Fiber Monitoring System	No	1					
1.11	Database software with license	Lot	1					
1.12	Antivirus License	Lot	1					
1.13	42 U Rack with accessories	No	4					
2	**PoP Locations**							

2.1	Mega POP/POP Switches	No	8					
2.2	Supply of Access Control System	Sets	3					
2.3	UPS	No	4					
2.4	Rack - 42U with accessories	Nos	8					
2.5	Rodent System	Nos	3					
3	**Access Locations**							
3.1	Indoor Switches	No	25					
3.2	UPS	No	25					
3.3	Rack - 9U with accessories	Nos	180					
Total Amount in INR								
NPV in INR								

Note:

i. The quantities mentioned are tentative in nature to arrive at L1 cost. The actual quantity may vary at the time of implementation.

ii. All Active components are with 3 years warranty, thus bidders are required to quote the O&M charges for the first three years accordingly

Addendum & Corrigendum-1
Request for Proposal
For
Creation of OFC Network for BRTS Corridor and other important SMC Locations

Volume 2 – Scope of Work

RFP No.: SSCDL-ConnectedSurat-OFC-RFP-01-2017

Last date for Online Price Bid Submission: 09.06.2017

Invited by
Surat Smart City Development limited
115, Smart City Cell, Surat Municipal Corporation,
Muglisara, Main Road, Surat - 395003, Gujarat.

Surat Smart City Development Limited

ADDENDUM AND CORRIGENDUM-1

RFP No.: SSCDL-ConnectedSurat-OFC-RFP-01-2017

The Bidders are requested to take note of the following changes made in the RFP documents, which are to be taken in to account while submitting the RFP. They shall be presumed to have done so and submitted the RFP accordingly.

- This Addendum and Corrigendum shall be the part of the RFP documents.
- All items specified in this Addendum and Corrigendum supersede relevant items to that effect as provided in the original RFP documents. All other specifications, terms and conditions of the original RFP document shall remain unchanged.
- Bidders shall read and consider following points, which shall be a part of the RFP documents.
- ***The queries raised and given by bidders, but the clarifications are not made in this Addendum and Corrigendum shall be considered to remain unchanged as per the terms and conditions mentioned in the original RFP documents.***
- ***Please read above changes across the RFP for both Volume 1 and Volume 2 as applicable. The above changes is also valid for draft Master Service Agreement mentioned in RFP Volume 1.***

#	Tender Reference	Existing Clause	Amended / New Clause
1.	Vol - 2, Section - 4.3, Last Mile Connectivity, Page No. - 11	12 core unarmoured cable will be laid separately in a duct for last mile connectivity at all SMC locations to be connected on either Core or Access layer fiber. Last mile connectivity will be implemented in ring for all locations. Mid-span splicing will be done between 96F / 48F of Core / Access layer cable and 12F last mile cables.	12 core armoured cable will be laid separately in a duct for last mile connectivity at all SMC locations to be connected on either Core or Access layer fiber. Last mile connectivity will be implemented in ring for all locations. Mid-span splicing will be done between 96F / 48F of Core / Access layer cable and 12F last mile cables. 1 number HDPE duct will be laid in last mile connectivity.
2.	Vol - 2, Section – 5.5.2, Enterprise Management System (EMS), Page No. - 15	(New clause added)	All the proposed EMS solution should be from a single vendor.
3.	Vol - 2, Section – 5.11, Other General Requirements, Page No. - 22	As – built drawings of all fiber optic routes.	As – built drawings of all fiber optic routes and OFC blowing report.
4.	Vol - 2, Section – 5.13.5, Installation of Hand Hole, Page No. - 30	The SI shall provide Hand Holes of size 1M(L)*1M(W)*1.2M(D) with single lid.	The SI shall provide Hand Holes of size 1M(L)*1M(W)*1.2M(D) with single/dual lid.
5.	Vol - 2, Section – 5.13.7, Optical Fiber Cable Testing Methodology, Page No. - 32	13. Acceptable link attenuation to be calculated.	13. Acceptable link attenuation/loss in dB per link (between 2 locations) to be calculated as per below. **For 1310 nm :** 0.34 dB attenuation / Km + 0.05 dB / splice + 1 dB connector loss **For 1550 nm :** 0.20 dB attenuation / Km + 0.05 dB / splice + 1 dB connector loss SI shall also be responsible to replace a patch of OFC cable for suitable length if optical losses are increased due to added splice joints etc. which may result in below conditions. • Any of the SLA (Network & Equipment Reliability and Service Reliability) mentioned in Section – 8.2.2 (SLA Matrix for Post Implementation SLAs) of Vol-1 of this RFP is violated. • Performance of link is deteriorated w.r.to user service. • Link is not getting up due to increased losses.
6.	Vol - 2, Section – 5.16, System Documents and User Manuals, Page No. - 34	The SI shall submit a complete set of Network design documents for all core and access rings, AutoCAD drawings for RoW, as – built drawings for all fiber routes, splicing reports, testing reports (OTDR and LSPM reports), bay face diagrams for all PoPs with marking of installed racks etc. to the SMC / SSCDL.	The SI shall submit a complete set of Network design documents for all core and access rings, AutoCAD drawings for RoW, as – built drawings for all fiber routes, OFC blowing reports, splicing reports, testing reports (OTDR and LSPM reports), bay face diagrams for all PoPs with marking of installed racks etc. to the SMC / SSCDL.

#	Tender Reference	Existing Clause	Amended / New Clause
7.	Vol - 2, Section – 5.17, Other, Page No. - 35	SI to ensure that for operation and maintenance team has the uniform with the identity card, safety shoes, helmet, Neon Jackets etc.	SI to ensure that for operation and maintenance team has the uniform with the identity card, safety shoes, helmet, Neon Jackets etc., however, O&M team members like patrollers, splicers etc. (who will not work in trench) will not be required to wear safety shoes and neon jackets.
8.	Vol - 2, Section – 6.4.2, Provision of the Field Operational Manpower and Resources, Page No. - 39	Vehicles (four-wheeler) for routine patrolling and mobilization of resources.	SI may use two wheeler for patrolling and four wheeler for FRT teams having tools & mobilization of other necessary resources.
9.	Vol - 2, Section – 7.16, Fiber Splice Joint Closure, Page No. - 69	The fiber splice joint closure shall have reusable gel end piece that opens and closes easily for adding or removing efficient cable sealing with specific grommets.	The fiber splice joint closure shall have sealing based on heat shrink technology or reusable gel end piece that opens and closes easily for adding or removing efficient cable sealing with specific grommets.
10.	Vol - 2, Section – 9, Annexure III - Common guidelines regarding compliance of systems / equipment, Page No. - 83	3. None of the IT / Non-IT equipment's proposed by the SI should be End of Life product. It is essential that the technical proposal is accompanied by the OEM certificate in the format given in Volume I of this Tender, where-in the OEM will certify that the product is not end of life product & shall support for at least 6 years from the date of Bid submission.	3. None of the IT / Non-IT equipment's proposed by the SI should be End of Life product. It is essential that the technical proposal is accompanied by the OEM certificate in the format given in Volume I of this Tender, where-in the OEM will certify that the product is not end of life product & shall support for at least 7 years from the date of Bid submission.
11.	Vol - 2, Section – 9, Annexure III - Common guidelines regarding compliance of systems / equipment, Page No. - 83	All servers, active networking components (Except Industrial Switches), security equipment and storage systems proposed should be from OEMs who are amongst the top 5 for world-wide market share in terms of revenue as per IDC latest published quarterly report presented in the latest Magic Quadrant of Gartner. SI is expected to attach the report along with the technical Bid. OEMs must have support center in India.	All servers, active networking components (Except Industrial Switches), security equipment and storage systems proposed should be from OEMs who are amongst the top 5 for world-wide market share in terms of revenue as per IDC latest published quarterly report / present in the latest Magic Quadrant (challengers / leaders) of Gartner. SI is expected to attach the report along with the technical Bid. OEMs must have support center in India.
12.	General	Unarmored cable.	Armored cable. Bidders are requested to read armored cable wherever unarmored cable is mentioned in RFP.
13.	General	(New clause added)	SMC / SSCDL will form a committee to audit the civil work involved in the Project.
14.	General	(New clause added)	144F capacity joint closure need to be installed for 96F Core route and 96F capacity joint closure need to be installed for 48F Access route.
15.	General	(New clause added)	96F FDP will be installed at all PoP locations for full cable termination of 96F Core OFC. 24F FDP will be installed at all Access locations for termination of last mile cables.

7 Annexure I – Specifications

7.1. Core Switch for NOC locations

#	Parameter	Minimum Specifications	Bidders Compliance (Yes, No)
1	Ports	• Minimum 24 x 10/100/1000 Base-TX/SFP ports with minimum 4 nos of 10G Base SX/LX/LR ports as per network solution offered. • 1000 Base-TX/SFP port Split as per field/site requirement • All RJ45 ports can auto-negotiate between 10Mbps/ 100Mbps/ 1000Mbps TX, half-duplex or full duplex and flow control for half-duplex ports.	
2	Switch type	Layer 3	
3	MAC	32k or more	
4	Backplane	Properly sized Switching fabric capacity (as per network configuration to meet performance requirements of wire speed switching for the connected devices)	
5	Port Features	Must support Port Mirroring, Port Trunking and 802.3ad LACP Link Aggregation port trunks	
6	Flow Control	Support IEEE 802.3x flow control for full-duplex mode ports.	
7	Protocols	• IPV4, IPv6 • Support 802.1D, 802.1S, 802.1w, Rate limiting • Support 802.1Q VLAN encapsulation, IGMP v1, v2 and v3 snooping • 802.1p Priority Queues, port mirroring, DiffServ • DHCP support • Support minimum 1024 or higher • Support IGMP Snooping and IGMP Querying • Support Multicasting • Should support Loop protection and Loop detection, • Should support Ring protection	
8	Access Control	• Support port security	

#	Parameter	Minimum Specifications	Bidders Compliance (Yes, No)
		• Support 802.1x (Port based network access control). • Support for MAC filtering. • Should support TACACS+ and RADIUS authentication	
9	VLAN	• Support 802.1Q Tagged VLAN and port based VLANs. • The switch must support dynamic VLAN Registration or equivalent • Dynamic Trunking protocol or equivalent	
10	Protocol and Traffic	• Network Time Protocol or equivalent Simple Network Time Protocol support • Switch should support traffic segmentation • Traffic classification should be based on user-definable application types: TOS, DSCP, Port based, TCP/UDP port number	
11	Management	• Switch needs to have console port for management via PC • Must have support SNMP v1,v2 and v3 • Should support RMON feature. • Should have accessibility using Telnet, SSH, Console access, easier software upgrade through network using TFTP/HTTP etc. Configuration management through CLI and GUI based software utility/using web interface (Optional).	
12	Power	• Core switch must support redundant power supply	

7.2. Core Router / Internet Router

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	Multi-Services	Should deliver multiple IP services over a flexible combination of interfaces	
2.	Ports	As per overall network architecture proposed by the bidder, the router should be populated with required number of LAN/WAN ports/modules, with cable for connectivity to other network elements.	
3.	Interface	Must support up to 10G interfaces as per the design. Must have capability to connect with variety of	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
	modules	interfaces.	
4.	Protocol Support	• Must have support for TCP/IP, PPP, Frame relay and HDLC • Must support VPN • Must have support for integration of data and voice services • Routing protocols of RIP, OSPF, and BGP. • Support IPV4, IPV6 Support load balancing	
5.	Manageability	Must be SNMP manageable (V1, V2 & V3)	
6.	Traffic control	Traffic Control/Access Control and Filtering features for flexible user control policies	
7.	Bandwidth	Bandwidth on demand for cost effective connection performance enhancement (Optional).	
8.	Remote Access	Remote access features	
9.	Redundancy	• Redundancy in terms of Power supply(s). Power supply should be able to support fully loaded chassis • All interface modules, power supplies should be hot-swappable	
10.	Security features	• MD5 encryption for routing protocol • NAT • RADIUS/AAA Authentication • Management Access policy • IPSec / Encryption • L2TP	
11.	QOS Features	• RSVP • Priority Queuing • Policy based routing • Traffic shaping • Time-based QoS Policy • Bandwidth Reservation / Committed Information Rate	

7.3. PoP Switch

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	General Requirement	• Must have minimum of 04 Modular Slots and Two slot for Supervisor cards. After inserting the IO Modules for the necessary configuration at least 02 slots should be free. If the Bidder has IO Module configuration which consumes more slot bidder should offer chassis with a higher configuration. Switch Fabric Slots should be different • Switch should have distributed switching architecture with passive backplane. Shall have CLOS Architecture or equivalent shared switch fabric capability with minimum four switch fabrics all supporting active switching to support high switching capacity.The switch should support OpenFlow specifications to enable SDN by allowing separation of the data (packet forwarding) and control (routing decision) paths • Switch must support minimum 1.9Tbps switching capacity or greater. • Switch should have a switching throughput which should be at least 2 Mpps or higher. • Switch should have suitable Visual Indicators for diagnostics and healthy / unhealthy status of Ports & modules. • No Ports or service modules should be populated on Switching Fabric/Management Module • Switch should support IPv4 and IPv6. • All the interface modules should be hot swappable, therefore, no downtime / reboot should be required for addition / removal / change of any of the interface modules. • Switch should support link aggregation across multiple switches in a cluster so as to be considered as single virtual link on switch cluster from access/distribution. • Switch should support clustering of at least two switches to work as a single entity for access/distribution switches. Both switches should work in active-active for all the Vlan traffic • There should not be any slot dependency for I/O modules. All kind of I/O modules can go in any of available payload slots	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
2.	Redundancy	• Must have Redundancy Power Supply Units (PSUs). And preferable these should be internal redundant power supplies. If Internal Redundant Power supplies are not available then the bidder should specifically offer redundancy and should give the technical note on the same. • Must have redundant of other components such as fans within network equipment. • Redundant CPU cards must support stateful switchover, ensuring synchronization to allow the standby CPU to immediately take over in sub-second time scales in the event of a failure. This is vitally important with the types of broadcast critical applications that may be running over the infrastructure to ensure that services are unaffected. • All components (including elements such as I/O cards, CPUs, power supplies and fans) must be hot swappable with zero disruption to traffic forwarding (Unicast or multicast).	
3.	Resiliency	• Shall have the capability to extend the control plane across multiple active switches making it a virtual switching fabric, enabling interconnected switches to perform as single Layer-2 switch and Layer-3 router • Should support IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol and IEEE 802.1s Multiple Spanning Tree Protocol • IEEE 802.3ad Link Aggregation Control Protocol (LACP) • Ring protocol support to provide sub-100 ms recovery for ring Ethernet-based topology • Virtual Router Redundancy Protocol (VRRP) to allow a group of routers to dynamically back each other up to create highly available routed environments • Graceful restart for OSPF, IS-IS and BGP protocols • Bidirectional Forwarding Detection (BFD) for OSPF, IS-IS and BGP protocols	
4.	Port density	• Switch should have sufficient number of 10G (SFP+/XFP) ports. In case of XFP interface OEM to confirm that the same is compatibility with SFP+ at the other end. • Switch should support the following 1000Base Transceivers as mentioned below • SX transceiver module for Multimode Fiber for supporting a minimum distance of 300 mtrs • LX/BX transceiver module for Single Fiber for supporting a maximum distance of 10Kms	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
		• ZX /LH transceiver module for Single Fiber for supporting A maximum distance of 70Kms • Switch should support the following 10G Base Transceivers as mentioned below • SR transceiver module for Multimode Fiber for supporting a minimum distance of 300 mtrs on OM3 and OM4 • LR transceiver module for Single mode fiber for supporting a maximum distance 10 Kms • ER/EW transceiver module for Single mode fiber for supporting a maximum distance 40 Kms • SPF+ Cables for Direct Connectivity on UTP should also be available.	
5.	Layer 2 features	• IEEE 802.1Q VLAN tagging. • 802. 1Q VLAN on all ports with support for minimum 3500 VLANs. • Support for minimum 32 k MAC addresses • Spanning Tree Protocol as per IEEE 802.1d • Multiple Spanning-Tree Protocol as per IEEE 802.1s • Rapid Spanning-Tree Protocol as per IEEE 802.1w • Self-learning of unicast & multicast MAC addresses and associated VLANs • Jumbo frames up to 9000 bytes • Link Aggregation Control Protocol (LACP) as per IEEE 802.3ad. • Minimum 128 Multi-link Trunks with 08 links per multi-link group. • "Port Mirroring" functionality for measurements using a network analyzer. • Broadcast, Multicast and Unicast storm control on per port basis to prevent degradation of overall system performance occurred due to faulty end stations. • Switch hardware should support IEEE 802.1ah MAC-in-MAC encapsulation or IEEE 802.1ad Qin Q. • Should support Ethernet (IEEE 802.3, 10BASE-T) • Should support Fast Ethernet (IEEE 802.3u, 100BASE-TX) • Must support Gigabit Ethernet (IEEE 802.3z, 802.3ab) • Must support Ten Gigabit Ethernet (IEEE 802.3ae)	

#	Parameters		Minimum Specifications	Bidders Compliance (Yes, No)
			• Software based standards for Network Device • Must support IEEE 802.1d - Spanning-Tree Protocol • Should support IEEE 802.1s - Multiple Spanning Tree Protocol • Must support IEEE 802.1q - VLAN encapsulation • Should support IEEE 802.3x Flow Control • Must support auto-sensing and auto-negotiation (Link Speed/Duplex)	
6.	Layer features	3	• Inter-VLAN IP routing for full layer 3 routing between two or more VLANs. • IP unicast routing protocols (static, RIPv2, OSPF, BGP). • Support for IPv6 routing in future like Static, OSPFv3, , BGP+ • Virtual Router Redundancy Protocol (VRRP) or equivalent. • VRF/VRF-lite virtualization feature • PIM-SM multicast routing protocol • Minimum 1000 IP interfaces. • Minimum 1000 IP multicast streams and 500 active PIM interfaces. • Minimum 120k IP forwarding table entries. • The Switch should support OSPF V2 and V3 from day one. • Should support policy based routing • Switch should support IGMP v1/v2/v3 as well as IGMP v1/v2/v3 snooping. • Switch hardware should support IEEE 802.1aq standard of shortest path bridging or IETF TRILL. Virtualization feature should be supported using SPB or MPLS or any other protocol. OEM/SI to give detailed noting on how virtualization is possible in the offered product. • Switch hardware should support IEEE 802.1ag standard based connectivity fault management (CFM) • Must support Static IP routing • Must support Open Shortest Path First (OSPF) v2 (RFC 2328) • Should support Intermediate system to intermediate system - IS-IS (RFC 1195)	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
		• Must support Border Gateway Protocol - BGPv4 (RFC 1771) • Should support Multi-Protocol Border Gateway Protocol - MP-BGP (RFC 2858) • Should support BGP Route Flap Damping (RFC 2439) • Should support Graceful Restart for OSPF (RFC 3623) / OSPFv3 (RFC 5187) • Should support Graceful Restart for IS-IS (RFC 3847 - Restart signaling for IS-IS) • Should support Graceful Restart for BGP (RFC 4724)	
7.	Quality of Service (QoS) Features	• Must support IEEE 802.1p class-of-service (CoS) prioritization • Should have advanced per-port QoS features in both ingress and egress directions. Please specify what is possible for ingress and what is possible for egress. • Should be able to classify and mark traffic based on physical port, IP DA/SA, L4 information, IEEE 802.1Q/P COS, IP Precedence (ToS), DSCP, MPLS exp bits switch should support DiffServ as per RFC 2474/2475 • Must support a minimum of four levels of prioritization per port • Should have per-port queue management and congestion avoidance features (e.g.RED / WRED). Please specify features supported • Must support rate limiting (to configurable levels) based on source/destination IP/MAC, L4 TCP/UDP • Must have the ability to complete traffic shaping to configurable levels based on source/destination IP/MAC and Layer 4 (TCP/UDP) protocols • There should not be any impact to performance or data forwarding when QoS features • Must support a "Priority" queuing mechanism to guarantee delivery of highest-priority (broadcast critical/delay-sensitive traffic) packets ahead of all other traffic • Must support ability to trust the QoS markings received on an ingress port	
8.	Security Features	• Must support multiple privilege levels for remote access (e.g. console or telnet access) • Must support Remote Authentication Dial-In User Service (RADIUS) and/or Terminal Access Controller Access Control System Plus (TACACS+)	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
		• Must support AAA using RADIUS (RFC 2138/2139) and/or TACACS+, enabling centralized control of the device and the ability to restrict unauthorized users from altering the configuration • Access Control features • Should support Access Control Lists (layers 2-4) in hardware. • Should support both ingress and egress access control lists per port • Should support access list parameters for control based on source and/or destination IP, source and/or destination subnet, protocol type (IP/TCP/UDP etc), source and/or destination port or any combination of these. • By enabling access lists, there should not be any impact on the router performance • Should be able to apply access control for SNMP/NTP access. (to ensure SNMP access only to Network Management Systems) • Should support per-port broadcast, multicast and uni-cast storm control • The router should support MD5 authentication for OSPF, IS-IS and BGP. • DHCP Snooping to prevent Man in the Middle attacks • Switch should support MAC Address based Filters / Access Control Lists (ACLs) on all switch ports • Switch should support Port as well as VLAN based Filters / ACLs. • Secure Shell (SSH) Protocol, HTTP and DoS protection • IP Route Filtering, Anti-spoofing etc.	
9.	Management Features	• Switch should have a console port with RS-232 Interface for configuration and diagnostic purposes. • Switch should be SNMP manageable with support for SNMP Version 1, 2 and 3. • Switch should support all the standard MIBs (MIB-I & II). • Switch should support TELNET and SSH Version-2 for Command Line Management. • Switch should support 4 groups of embedded RMON (history, statistics, alarm and events).	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
		• Switch should support System & Event logging functions as well as forwarding of these logs to upto ten separate syslog server for log management. • Switch should support on-line software reconfiguration to implement changes without rebooting. Any changes in the configuration of switches related to Layer-2 & 3 functions, VLAN, STP, Security, QoS should not require rebooting of the switch. • Switch should have comprehensive debugging features required for software & hardware fault diagnosis. • Switch should support Multiple privilege levels to provide different levels of access. • Switch should support NTP (Network Time Protocol) as per RFC 1305. • Switch should support FTP and TFTP. • Switch should have inbuilt element manager accessed via HTTP (Web GUI) or using external management software • "Must support Network Timing Protocol (NTPv3) and should support the following: • Configuration of minimum one NTP server. • NTP authentication" • "Extensive debugging capabilities to assist in hardware/software problem resolution. At a minimum, debugging support should include: • Detailed packet level debugging for troubleshooting purposes • Detailed IGP/EGP (OSPF/IS-IS/BGP) for troubleshooting purposes • Detailed Multicast debugging (e.g. IGMP/ PIM) for troubleshooting purposes • QoS debugging for troubleshooting purposes" • Debugging must not have an impact on performance or data forwarding capabilities of the device • Network switch should not reach it's end of life cycle for a minimum of 7 years from the date of bid submission or bidder must ensure replacing the same with similar or higher or equivalent model from same OEM without any additional cost applied to SMC.It is desirable that the device has support for a XML or equivalent interface allowing for future querying, configuration and management options	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
		• Hardware modules should be simple to access for removal and replacement, allowing for replacement while ensuring continuous system operations and availability	
10.	Standards	• RoHS Compliant • IEEE 802.1x support • IEEE 802.3x full duplex on 10BASE-T and 100BASE-TX ports • IEEE 802.1D Spanning-Tree Protocol • IEEE 802.1p class-of-service (CoS) prioritization • IEEE 802.1Q VLAN • IEEE 802.3x be on 10 BaseTx / 100 Base Tx / 1000 Base Tx • 10G Base-SR, 10G Base LR. • IEEE 802.3u 10 BaseT / 100 Base Tx /1000 Base Tx	

7.4. Next Generation Firewall / Unified Threat Management

SI will have to consider 2 NGFWs / UTMs (1+1) at Muglisara PoP for better redundancy.

#	Item	Minimum Specifications	Bidder Compliance (Yes/No)
1.	Basic Criteria	• OEM should have support Centre in India. • Appliance must be ICSA Labs certified for Firewall. • The proposed solution should support High Availability Active-Active/Passive mode	
2.	Minimum Hardware Specification	• Minimum 2 x 10GbE SFP (Mini GBIC) Ports/SFP+ form day 1 • Minimum 10 x 1GbE SFP (Mini GBIC) Ports from day 1 • Minimum 10 x 1GbE RJ45/Copper Ports from day 1 • Minimum 1 x USB Port • 2 x Integrated and Hot swappable Power Supply • Inbuilt Storage with minimum 200 GB Capacity	

#	Item	Minimum Specifications	Bidder Compliance (Yes/No)
		• Minimum 1x Console Management Ports (RJ45) & should provide http, https, SSH, Telnet, SNMP based management console for managing and configuring. • Ports can be configurable for LAN/ WAN/DMZ	
3.	Appliance Throughput	• Minimum Firewall throughput of 50 Gbps or higher • Minimum 2,50,000 New Sessions/sec • Minimum 1,00,00,000 Concurrent sessions • Minimum 3.5 Gbps for SSL VPN throughput or higher • Minimum 2.2 Gbps Antivirus throughput • Minimum 3 Gbps throuput for NGFW/UTM	
4.	General Features	• Should be appliance based and rack mountable. • Device in built DNS server for prevention of phishing and pharming scams involving DNS poisoning while reducing time taken for DNS mapping. • Intrusion Prevention System • Gateway Anti-virus • Gateway Anti-spam with DLP functionality • Web Content & Application Filtering • Web Application Firewall • Bandwidth Management/Traffic Shaping capable of setting guarantee bandwidth and maximum bandwidth per firewall policy • High Availability (Active-Active & Active-Passive) • The High Availability should be supported in the Firewall from the day one and without any extra license. • The Firewall should support Static, Policy Base, Identity based, Multicast routing and Dynamic routing for RIP1 & 2, OSPF, OSPFv3, BGP4, RIPing, Server Load Balancing. • The Firewall should belong to a family of products that attains industry standard Approved Certification and attains IPv6 Ready Phase 2 & IPv6 Certification • Should support IPv6 ACL to implement security Policy for IPv6 traffic. • Support for user authentication over SMS and in built two factor authentication without any additional cost. • The proposed solution should support integration with Windows NTLM, Active Directory, LDAP, Radius, or Local Database for user authentication. • Country Based Blocking, FQDN support and should support MIX mode deployment • Should have an integrated wireless controller and should be able to manage multiple wireless access points centrally from web admin console.	

#	Item	Minimum Specifications	Bidder Compliance (Yes/No)
5.	Gateway Antivirus, Anti-Spyware and Anti-Spam	• Firewall must able to scan http, https, IMAP, IMAPs, FTP, FTPs, POP, POPs, SMTP, SMTPs & MAPI protocols with AV signatures • Virus, Worm, Trojan Detection and Removal, Automatic Virus signature database update, Real-Time blacklist, MIME header check, and Redirect spam mails to dedicated email address, image-spam filter, Spam Notification, Zero hour Virus outbreak protection.	
6.	Web and Application Filtering	• The proposed solution should be able to enable or disable Web Filter per firewall policy or based on firewall authenticated user groups for both HTTP and HTTPS • Should blocks web plug-ins such as ActiveX, Java Applet, and Cookies & Shall include Web URL block, Web keyword block, Web Exempt List • The proposed solution must work as a HTTP proxy server with integrated Firewall, Anti-Virus, Anti-Spam, Content filtering, IPS. • The proposed solution should be able to enable or disable Web Filter per firewall policy or based on firewall authenticated user groups for both HTTP and HTTPS • The solution shall allow administrators to create multiple new local URL filtering categories besides dynamic categories • Application Control Solution must provide option to create custom signature for applications & it should able to understand • Well-known application like P2P, Voice, etc without any dependency on the ports	
7.	Wireless Security and Control	• Should act as a wireless controller, Simple plug-and-play deployment of wireless access points (APs) - automatically appear on the firewall control centre, Central monitor and manage all APs and wireless clients through the built-in wireless controller, Support for IEEE 802.1X (RADIUS authentication), Wireless repeating with supported Aps.	
8.	Intrusion Prevention System (IPS)	• For different attacks like Mail Attack, FTP Attack, HTTP Attack, DNS Attack, ICPM Attack, TCP/IP Attack, DOS and DDOS Attack, TelNet Attack. • Signatures: Custom, IPS Policies: Multiple, Custom, User-based policy creation, Automatic real-time updates. • Should have a built-in Signature and Anomaly based IPS engine on the same unit and Anomaly based detection should be based on thresholds. • Able to prevent denial of service and Distributed Denial of Service attacks on signature. • Administrator shall be able to configure DoS policies that are used to associate DoS settings with traffic that reaches an interface based on defined services, source and destinations IP/Range.	
9.	Advance Threat Protection	• Advanced Threat Protection (Detect and block network traffic attempting to contact command and control servers). • It also must have facility to block Bot attacks from day 1 & also should scan Mobile devices security from day 1	

#	Item	Minimum Specifications	Bidder Compliance (Yes/No)
10.	Zero day prevention or Sandboxing	• Solution should inspect executables and documents containing executable content including .exe, .com, .dll, .docx, rtx, etc , Should support malware behavior analysis.	
11.	VPN	• IPsec and SSL must be a part of Basic Appliance. • The SSL VPN should be integrated solution and there should be no user based licensing for SSL VPN with SSL encryption/decryption. • Firewall must have at least 1000 SSL VPN client in Route mode from the day 1. • The system shall support IPSEC site-to-site VPN and remote user VPN in transparent mode without any additional cost for VPN clients.	
12.	Load Balance	• For Automated Failover/Failback, Multi-WAN failover, High availability: Active-Active. QoS, OSPF, RIPv2, BGP, Policy routing based on Application and User support Round Robin Load Balancing.	
13.	Bandwidth Management	• Application and user bandwidth management, Multi WAN bandwidth reporting, guaranteed bandwidth policy. Bandwidth for User, Group, Firewall Rule, URL and Applications.	
14.	Monitoring and Reporting System	• Reports should be accessible through HTTP/HTTPS/Client based. • Should provide reports in Graphical/CSV/PDF format or cloud based.	
15.	License for UTM/NGFW	• The proposed solution must be licensed per unit for **7 years** & there should not be any license limit on number of sessions, firewall rules, maximum number of connections, no of nodes/desktops, no. of IPs, domains, etc. for all modules. It must include minimum **7 years** subscription for IPS & IDS, Gateway Antivirus, Anti-Spyware, Content Filtering System, Log Analysis & Management software. • Hardware must be latest product from OEM and it must not be under the list end of sale, end of support from OEM till 7 years from date of commissioning.	

7.5. Indoor Access Switch for connecting SMC locations

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	Operating Temperature	0°C to 45°C	
2.	General Requirements	• The switch should be 19" rack mountable	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
		• The switch should have sufficient number of 10/100/1000 baseT POE+. All Ports should have POE+ Power from day one and for this additional power supply is required then the same needs to be provided by the Bidder and the cost of the same should be considered per switch • The switch should support Auto MDI/MDI-X with Auto-Polarity & Jumbo frames. • The switch ports should be 802.3at-compliant PoE+ ports • Should reduce power consumption in accordance with IEEE 802.3az • The switch should support strict priority queuing configuration that helps in ensuring the highest priority packets are given the highest importance and kept ahead of all traffic. The switch should support configuration of priority level per port and either of three: Low, High, and Critical. Priority can be configured per port • The switch should have minimum of 4 SPF+ slots • The switch should have support for 1000Base-T, 1000Base-SX,1000Base-LX • The switch should have support for 10G based SR and LRM modules for interconnecting the switch over Multimode OM4 or OM3 grade fiber and Single Mode Fibre • Switch should have distributed switching architecture with passive backplane. The switch should support OpenFlow specifications to enable SDN by allowing separation of the data (packet forwarding) and control (routing decision) paths. • Switch should be AC powered switch.	
3.	Backplane and throughput	• Switch bandwidth should be minimum 128 Gbps or higher. • The switch should have 90 Mpps or higher packet forwarding throughput • The switch should support minimum 15K mac address entries	
4.	Resiliency / Redundancy	• The switch should support spanning Tree (802.1d) protocol • The switch should support Fast Start with Spanning Tree (802.1d) • The switch should support Rapid Spanning Tree (802.1w) • The switch should support Multiple Spanning Tree Groups (802.1s) • The switch should load-share the traffic on all the uplinks to core switch • The switch should support BPDU Filter • The switch should be Static 802.3ad compliant • The switch should support 802.3ad LACP • All the uplinks should be passing all vlans traffic with load sharing model.	
5.	QoS	• The switch should support Traffic Policing, DiffServ & 802.1p Prioritisation • The switch should support IP Filtering, and Policies • The switch must support configuring QOS features across the entire stack of switches	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
		• The switch should support minimum of 250 VLANs per switch • The switch should support Port-based VLAN • The switch should support Protocol-based VLAN • The switch should have Per VLAN Tagging Support • The switch should support IPv6 vlans • The switch should have capability to support static routing, RIPv1/v2 • The switch should support BootP & DHCP relay • The switch should support Proxy ARP • The switch should support UDP Forwarding • The switch should support IGMP v1/v2/v3 proxy • The switch should support IGMP v1/v2/v3 snooping	
6.	Security	• The switch should support RADIUS Authentication • The switch should support 802.1x Extensible Authentication • The switch should support 802.1x Multiple Host Multiple Authentication per port (MHMA) • The switch should support per user ACL support for 802.1x • The switch should support Configurable Per VLAN MAC learning • The switch should support MAC Authentication Bypass / Guest VLAN with limited access to network • The switch should support DHCP Snooping • The switch should support Dynamic ARP Inspection • The switch should support IP Source guard • The switch should support TACACS+ • The switch should support Endpoint Security- DHCP / dot1x mode support • The switch should support Multiple authentication methods inclusive of 802.1x, MAC Authentication Bypass or equivalent method. • The switch should support Multidomain Authentication or concurrent dot1x/ MAC/web schemes per port • The switch should support Layer 2 Threat Defense capabilities for MAN in the MIDDLE Attacks like MAC, IP and ARP spoofing • The switch should support Policy Based ACL • The switch should support Security on Full IPV6 Source and Destination Address	
7.	Management & Operations	• The switch should support Multiple Configuration File Support • Should have accessibility using Telnet, SSH, Console access, easier software upgrade through network using TFTP/HTTP etc. Configuration management through CLI and GUI based software utility/using web interface (HTTP).	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
		• The switch should support SNMP v1, v2 & v3. • The switch should support RADIUS Authentication • The switch should have RMON Support per Port (events, alarms, history, statistics) • The switch should have SSHv2 support • The switch should support Simple Network Time Protocol (SNTP) • The switch should support 802.1AB Standards based Auto topology • The switch should support Dynamic power management / EEE (Energy-Efficient Ethernet) • The switch must support encrypting administrator traffic during Telnet and SNMP session there by providing network security.	

7.6. Fiber Distribution Panel (FDP) – 24F

The suggested technical specifications for the FDP are as follows:

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	Maximum Height	44.45 mm	
2.	Maximum Width	482.6 mm	
3.	Maximum Depth	205 mm	
4.	Capacity	24 Fibers	
5.	Type of Connector	SC/LC/APC (As per field requirement)	
6.	Construction	Complete Aluminum Alloy Housing, fully powder coated.	
7.	Drawer concept	It should allow Easy access to splicing tray.	
8.	Return Loss	Should be greater than 65 dB.	
9.	Connector Loss	Not more than 0.5 dB per mated pair.	
10.	Others	The fiber distribution panel shall be suitable for fixing into IP 65 enclosure which shall be	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
		mounted on the pole and would also house access switch and other accessories and also be suitable for fixing into 19" rack.	
11.		The fiber distribution panel shall have sufficient glands for entry and exit of optical fiber and pigtails.	
12.		The fiber distribution panel shall have arrangement for cable attachment and grounding of cable armor.	
13.		The FDP shall have sufficient number of splice trays, pigtails, connector / adapters, fibre guides, radius control, secure tie downs etc. fitted in it.	
14.		It should have Trays with hinges which facilitates easy fiber management and greater access during installation and rework.	

Fiber Distribution Panel (FDP) – 96F

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1	Maximum Height	4U rack space	
2	Capacity	96 Fibers	
3	Type of Connector	SC/LC/APC (As per field requirement)	
4	Construction	Complete Aluminum Alloy Housing, fully powder coated.	
5	Drawer concept	It should allow Easy access to splicing tray.	
6	Return Loss	Should be greater than 65 dB.	
7	Connector Loss	Not more than 0.5 dB per mated pair.	
8	Others	The fiber distribution panel shall be suitable for fixing into 19" rack.	

9		The fiber distribution panel shall have sufficient glands for entry and exit of optical fiber and pigtails.	
10		The FDP shall have front and back rack mounting provision.	
11		The FDP shall have glide mounting system.	
12		The FDP shall have sufficient number of splice trays, pigtails, connector / adapters, fibre guides, radius control, secure tie downs etc. fitted in it.	
13		It should have Trays with hinges which facilitates easy fiber management and greater access during installation and rework.	

7.7. 42U Rack Cabinets

The suggested technical specifications for the 42U Rack Cabinets are as follows:

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	Depth	1070.00 mm	
2.	Minimum Mounting Depth	191.00 mm	
3.	Maximum Mounting Depth	915.00 mm	
4.	Rack Height	42U	
5.	Rack Width	19”	
6.	Color	Black	
7.	Vertical Post Thickness	16 Gauge	
8.	Front Door	16 gauge	
9.	Rear Door	18 gauge	
10.	Roof	18 gauge	
11.	EIA Mounting Rails	14 gauge	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
12.	Side Panels	18 gauge	
13.	Others	The front door shall be insulated metallic door fitted with rubber gasket and a central glass for clear visibility of all components installed in the rack.	
14.		The 42U rack shall have two cable managers fully separated so they do not cross each other for power and network cables.	
15.		The 42U Rack shall have provision for two separate top entries one for power and one for network cables.	
16.		The 42U Rack shall have sufficient number of shelves to accommodate specified equipment in the Mega Point Of Presence (POP)	
17.		Necessary provisions for PDU/Power strip for high availability.	
18.		The rack shall have necessary arrangements for fixing central strength member of OFC cable, cable attachment and grounding armor of cable.	

7.8. Optical Fiber Cables (OFC)

The technical requirements for all type of Fiber Optic Cable (OFC) (96 Core, 48 Core and 12 Core OFC):

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	Single Mode Optical Fiber	ITU-T-G.652D	
2.	Maximum Cabled Fiber Attenuation db/Km	1310nm:0.34 and 1550nm:0.20	
3.	Tensile Strength	≥2500N	
4.	Crush Resistance	≥3000N	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
5.	Fiber Polarization Mode Dispersion (PMD)	≤0.2 ps/√km	
6.	Impact Strength	25Nm	
7.	Operating Temperature	-20^{0}C to 70^{0}C	
8.	Color Coding of Tubes and Fibers	EIA/TIA-598	
9.	Armouring	Type : ECCS tape Tape thickness : >= 0.14mm	
10.	Outer Jacket Thickness	≥1.6mm	
11.	Water Tightness	EIA/TIA-455-81B	
12.	Minimum Continuous Length	2km±10%,	
13.	Cable Design Life	More than 25 Years	
14.		The optical fiber cable shall be made of Germanium doped silica glass or pure silica glass.	
15.		The mode field concentricity shall be less than 1 µm	
16.		The cladding of the Optical Fiber shall be made of silica glass having lower refractive index. The outside diameter of the cladded fiber shall be 125 µm with tolerance of ± 2.0 µm.	
17.		The non-circularity of cladding surface shall be 2%, maximum.	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
18.	Others	The nominal fiber coating diameter shall be in the range of 245 to 400 microns.	
19.		Maximum continuous operating temperature without optical degradation shall be 65°C.	
20.		Maximum optical loss variation at temperature range of -5°C to +70°C shall be ±0.05dB/km.	
21.		Water swellable yarns shall be added to prevent water ingress in the core of cable	
22.		The loose tubes carrying the fiber cores shall be made of thermoplastic or equivalent material which will not kink during normal operation of the cable including laying or blowing of cable.	
23.		Outer sheathing shall be made of UV proof black MDPE/HDPE. The sheath shall have smooth finish and shall be termite resistant.	
24.		All the OFC shall be clearly marked at intervals of 1 meter with the following data which is not less than 5 mm high. The details of marking on cable shall be approved by CLIENT before commencement of manufacturing. • Name of Client with logo • No of Fibers (12Core/48Core/96Core) • Type of OFC • Manufacture's name or trade mark • Year of manufacturing • Running length marking • Cable ID	
25.		All optical fiber cable shall be supplied on strong wooden drums provided with lagging with adequate strength, constructed to protect the cabling against all damage and displacement during transit, storage and subsequent handling during installation	

The technical requirements for the 96 / 48 / 12 Core OFC are as follows:

7.9. 96 Core OFC – Core Layer

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	Fiber Count	96 nos.	
2.	Fibers per tube	12 nos.	
3.	Tubes	08 nos.	
4.	Diameter of Cable	15mm±5%	
5.	Weight of Cable	210kg/km±10%	

7.10. 48 Core OFC – Access Layer

The technical requirements for the 48 Core OFC are as follows:

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	Fiber Count	48 nos.	
2.	Fibers per tube	12 nos.	
3.	Tubes	04 nos.	
4.	Diameter of Cable	13mm±5%	
5.	Weight of Cable	170kg/km±10%	

7.11. 12 Core OFC – Last Mile

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	Fiber Count	12 nos.	
2.	Fibers per tube	12 nos.	
3.	Tubes	01 nos.	
4.	Diameter of Cable	12mm±5%	
5.	Weight of Cable	150kg/km±10%	

7.12. Fiber Splice Joint Closure

The technical requirements for the Fiber Splice Joint Closure are as follows:

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	Closure Length	420 mm	
2.	Closure outer diameter including Clamp	205 mm	
3.	Fiber Tray Capacity	12 cores	
4.	Fiber Capacity	144 nos.	
5.	Cable Ports	4 cable entry ports + 1 no. oval port for branching application.	
6.	Number of Fiber Splice	12 nos.	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
	Trays		
7.	Others	The fiber splice joint closure shall have reusable gel end piece that opens and closes easily for adding or removing efficient cable sealing with specific grommets.	
8.		The fiber splice joint closure shall provide splice trays that are hinged to provide access to all splices without disturbing other splice trays for inter-tray fiber management.	
9.		The fiber splice joint closure shall be water-proof and dust-proof.	
10.		The fiber splice joint closure shall have a mechanism to route at least 1 meter of loose tube per tray per optical fiber cable	
11.		The joint closure shall have an earthing stud provided for grounding the armor of fibre cable.	