

REQUEST FOR TENDER

For

PON BASED LAN EXTENTION IN CPPRI CAMPUS

Tender Reference No.:CPPRI/PUR/56/Eng. Design & Computer Maint./2015-16

Date: 15.9.2016



CENTRAL PULP & PAPER RESEARCH INSTITUTE

(An Autonomous organization under the administrative control of Ministry of Commerce & Industry,
Govt. of India) (Registered under Societies Act)

Post Box No. 174, PAPER MILL ROAD,
HIMMAT NAGAR,

SAHARANPUR-247001 (U.P.) INDIA

Tele Phone Direct (0132) 2714050, Tel. EPABX (0132) 2714059, 2714061, 2714062

1.1 The address and contact numbers for seeking clarifications regarding this RFT are given below:

Bids to be addressed to : The Director, CPPRI,
PAPER MILL ROAD, HIMMAT NAGAR,
SAHARANPUR-247001 (U.P.)

Name/designation of the contact personnel : Section Officer (Store & Purchase)

Telephone no. of the contact personnel : Tel. EPABX (0132) 2714059, 2714061, 2714062

E.mail ids to contact personnel : cppripurchase@gmail.com

Fax Number : (0132) 2714052, 2714056

1.2 The important dates of the RFT is as follows:-

Published on https://eprocure.gov.in/eprocure	15.09.2016
Bid Document download Date	15.09.2016
Clarification Start Date	15.9.2016 at 10.00 Hrs.(IST)
Clarification End Date	22.9.2016 at 17.00 Hrs.(IST)
Bid Submission Start Date	7.10.2016 at 10.00 Hrs.(IST)
Bid Submission End Date & time	25.10.2016 at 14:00 Hrs.(IST)
Technical Bid Opening Date & Time	25.10.2016 at 15.00 Hrs.(IST)
Financial Bid Opening Date	Shall be intimated after technical evaluation

Note:-

- a. All details, regarding the subject tender are available on the website www.cppri.org.in and <https://eprocure.gov.in/eprocure>. Any change/modification in the tender enquiry will be intimated through above websites only. Bidder are therefore, requested to visit these websites regularly to keep themselves updated.
- b. Manual bids will not be accepted.
- c. For submission of E-bid, bidders are required to get themselves registered with <https://eprocure.gov.in/eprocure> website along with class II or III digital signature certificates issued by CCS under IT Act-2003. The detailed procedure is available in the website under the tab '**Help for Contractor**', Information about DSC, 'Bidders manual kit' etc.
- d. The original DD towards the Tender Document Fee and Earnest Money Deposit (EMD) in favour of Central Pulp & Paper Research Institute, Saharanpur payable at Saharanpur should be reached Central Pulp & Paper Research Institute, Paper Mill Road, Himmat Nagar, Saharanpur-247001 (U.P.) before the last date for submission of bids, failing which offer will be liable for rejection, Bidders shall attach scanned copies of Earnest Money Deposit and Tender Fee documents while submitting bids online.
- e. Any queries relating to the process of online bid submission **or** queries relating to CPP Portal are available at <https://eprocure.gov.in/eprocure>. Further, any clarifications, the bidders may contact on 24 x 7 Help Desk Number 0120-4200462, 0120-4001002 or Mobile No. 918826246593 or Mail to: support-eproc@nic.in



Phone : (0132) 2714059
2714061, 2714062
Fax : 0132 – 2714052
Website : www.cppri.org
E-mail : director@cppri.org.in

Central Pulp & Paper Research Institute

(An Autonomous organization registered under Societies Act. under the Administrative control of the Ministry of Commerce & Industry)
(GOVT. OF INDIA)
POST BOX No. 174, PAPER MILL ROAD, HIMMAT NAGAR,
SAHARANPUR □ 247001

No. CPPRI/PUR/56/Eng. Design & Computer Maint./ 2015-16

Date: 15.9.2016

Dear Sir,

Central Pulp & Paper Research Institute (CPPRI) is an autonomous organization under the administrative Control of the Ministry of Commerce & Industry (Govt. of India) dedicated to pulp & paper sector. CPPRI has LAN, Server, Data Storage System, etc. The existing server, client's computer systems and LAN system at CPPRI are IPv6 compliant and are suitable to integrate with latest IT solutions. In order to fulfill the surveillance requirement of the Institute the existing network systems need to be integrated with following items which we are interested to purchase. Since we are engaged in Research and Development activities of National/ International repute, therefore, please quote your minimum rates.

Sealed tender is invited for existing PON based LAN expansion in CPPRI Campus. This would be a two bid systems/ Commercial & Technical Bid Separately. The quantity specified below is subject to variation at a later stage. The detailed notice inviting Bids and Bid Documents can be accessed from the website www.cppri.org.in and <https://eprocure.gov.in/eprocure>

GEPON-LAN Extension BoQ for CPPRI Campus			
S.N.	Product	UOM	Qty.
1	Supply of GEPON Chassis embedded at-least with 2 GEPON Ports and 3 Open Slots for GEPON Modules	No	1
2	Supply of 1 Port ONU Bridge for existing GEPON Network	No	100
3	Supply of 1000 Base LX-SFP for 10 KM.	No	10
4	Supply of 2 Core Single Mode Droplite Optical Fiber cable	Mtr	2800
5	Supply of 6 Core Single Mode Optical Fiber cable armoured	Mtr	2500
6	Supply of Fiber patch SC to SC Single Mode 2m	No	110
7	Supply of 24 F splicing enclosure With splice tray and splitter tray	No	10
8	Supply of 12 Port Fiber LIU SC type SM Loaded	No	1
9	Supply of 2 port SMB with SC type SM coupler for fiber at ONU End	No	100
10	Supply of SC Style SM Fiber Pigtails 1 meter	No	110

11	Supply of Cat 6 ,4 pair UTP cable 305 meter box	No	3
12	Supply of RJ 45 connector	No	200
13	Supply of 25 MM conduit/channel/flexible pipe	Mtr	2000
14	Supply of 1:4 optical splitter without Connector	Nos.	4
15	Supply of 1:16 optical splitter without connector	Nos.	6
16	Installation and Configuration of Active & Passive Components (LS)	(LS)	1

(Technical Specification enclosed as per Annexure 'A')

You are advised to go through the instructions overleaf before submitting your offer.

Yours faithfully,

(Roshan Lal)
Section Officer(Store & Purchase)

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- h. For submission of E-bid, bidders are required to get themselves registered with <https://eprocure.gov.in/eprocure> website along with class II or III digital signature certificates issued by CCS under IT Act-2003. The detailed procedure is available in the website under the tab 'Help for Contractor', Information about DSC', 'Bidders manual kit' etc.
- i. **The original DD towards the Tender Document Fee Rs. 500/- and Earnest Money Deposit (EMD) Rs.49,000/- (Forty-nine Thousand Only) in favor of Central Pulp & Paper Research Institute, Saharanpur payable at Saharanpur** should be reached Central Pulp & Paper Research Institute, Paper Mill Road, Himmat Nagar, Saharanpur-247001 (U.P.) before the last date for submission of bids failing which offer will be liable for rejection, Bidders shall attach scanned copies of Earnest Money Deposit and Tender Fee documents while submitting bids online.
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Help Desk Number 0120-4200462, 0120-4001002 or Mobile No 91 8826246593 or Mail to :

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- 2.0. This RFT is being issued with no financial commitment and the Buyer reserves the right to change or vary any part thereof at any stage. Buyer reserves the right to withdraw the RFT, should it become necessary at any stage.

3.0. *Special Instructions to the Contractors/Bidders for the e-submission of the bids online through eProcurement Portal*

- a) Bidder should do Online Enrolment in this Portal using the option Click Here to Enrol available in the Home Page. Then the Digital Signature enrolment has to be done with the e-token, after logging into the portal. The e-token may be obtained from one of the authorized Certifying Authorities such as eMudhraCA/ GNFC/ IDRBT/ MtnITrustline/ SafeScript/TCS.
- b) Bidder then logs into the portal giving user id / password chosen during enrollment.
- c) The e-token that is registered should be used by the bidder and should not be misused by others. DSC once mapped to an account cannot be remapped to any other account. It can only be Inactivated.
- d) The Bidders can update well in advance, the documents such as certificates, purchase order details etc., under **My Documents** option and these can be selected as per tender requirements and then attached along with bid documents during bid submission. This will ensure lesser upload of bid documents.
- e) After downloading / getting the tender schedules, the Bidder should go through them carefully and then submit the documents as per the tender document, otherwise, the bid will be rejected.
- f) The BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for that tender. Bidders are allowed to enter the Bidder Name and Values only.
- g) If there are any clarifications, this may be obtained online through the e-Procurement Portal, or through the contact details given in the tender document. Bidder should take into account of the corrigendum published before submitting the bids online.
- h) Bidder, in advance, should prepare the bid documents to be submitted as indicated in the tender schedule and they should be in PDF/XLS/RAR/DWF formats. If there is more than one document, they can be clubbed together.
- i) Bidder should arrange for the EMD as specified in the tender. The original should be posted/couriered/given in person to the Tender Inviting Authority, within the bid submission date and time for the tender.
- j) The bidder reads the terms and conditions and accepts the same to proceed further to submit the bids.
- k) The bidder has to submit the tender document(s) online well in advance before the prescribed time to avoid any delay or problem during the bid submission process.

- l) There is no limit on the size of the file uploaded at the server end. However, the upload is decided on the Memory available at the Client System as well as the Network bandwidth available at the client side at that point of time. In order to reduce the file size, bidders are suggested to scan the documents in 75-100 DPI so that the clarity is maintained and also the size of file also gets reduced. This will help in quick uploading even at very low bandwidth speeds.
- m) It is important to note that, **the bidder has to Click on the Freeze Bid Button, to ensure that he/she completes the Bid Submission Process. Bids Which are not Frozen are considered as Incomplete/Invalid bids and are not considered for evaluation purposes.**
- n) In case of Offline payments, the details of the Earnest Money Deposit(EMD) document submitted physically to the Department and the scanned copies furnished at the time of bid submission online should be the same otherwise the Tender will be summarily rejected.
- o) The **Tender Inviting Authority (TIA)** will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders due to local issues.
- p) The bidder may submit the bid documents online mode only, through this portal. Offline documents will not be handled through this system.
- q) At the time of freezing the bid, the eProcurement system will give a successful bid updation message after uploading all the bid documents submitted and then a bid summary will be shown with the bid no, date & time of submission of the bid with all other relevant details. The documents submitted by the bidders will be digitally signed using the e-token of the bidder and then submitted.
- r) After the bid submission, the bid summary has to be printed and kept as an acknowledgement as a token of the submission of the bid. The bid summary will act as a proof of bid submission for a tender floated and will also act as an entry point to participate in the bid opening event.
- s) Successful bid submission from the system means, the bids as uploaded by the bidder is received and stored in the system. System does not certify for its correctness.
- t) The bidder should see that the bid documents submitted should be free from virus and if the documents could not be opened, due to virus, during tender opening, the bid is liable to be rejected.
- u) The time that is displayed from the server clock at the top of the tender Portal, will be valid for all actions of requesting bid submission, bid opening etc., in the e-Procurement portal. The Time followed in this portal is as per Indian Standard Time (IST) which is GMT+5:30. The bidders should adhere to this time during bid submission.

- v) All the data being entered by the bidders would be encrypted at the client end. And the software uses PKI encryption techniques to ensure the secrecy of the data. The data entered will not be viewable by unauthorized persons during bid submission and not viewable by any one until the time of bid opening. Overall, the submitted bid documents become readable only after the tender opening by the authorized individual.
- w) During transmission of bid document, the confidentiality of the bid is maintained since the data is transferred over Secured Socket Layer (SSL) with 256 bit encryption technology. Data encryption of sensitive fields is also done.
- x) The bidders are requested to submitted the bids through online eProcurement system to the TIA well before the bid submission end date the time (**as per Server System Clock**)

INSTRUCTIONS

1. Full Specifications, Make, Model, leaflet/literature etc. should be given while quoting rates.
2. The bidder must be an OEM or their authorized Dealer, Distributor, Systems Integrator or Partner. Authorization letter should be submitted along with technical bid.
3. **The Bidder must have minimum one installation / case study / success story of using Ethernet PON technology in a Government organization. P.O. copy confirm to this effect must be enclosed along with the bid.**
4. **All the active and passive products quoted should be completely compatible and interoperable with existing Ethernet PON deployment in the CPPRI campus, ensuring this shall be the complete responsibility of the bidder and the bidder has to submit an undertaking on a non-judicial stamp paper to this effect along with the bid.**
5. The Price should be quoted FOR: CPPRI. All terms & conditions like Rate of Sales Tax, Insurance, Mode of Payment, Delivery period, validity period, and Warranty clause should be clearly mentioned in the offer otherwise, quotation will be summarily rejected. Kindly supply additional literature/ catalogues etc. wherever required.
6. Wherever, the prices are quoted on Ex-Works/Factory/Godown basis, the other charges like packing forwarding, freight, transportation charges etc. should be mentioned clearly in the quotation. The words extra, as applicable or at actual should not be used. In the absence of any mention of these charges your offer may be rejected as in complete.
7. The material is to be dispatch duly insured against theft, loss or breakage during transit and the rates chargeable for insurance may invariably be quoted separately.
8. The rates of Sales Tax should be clearly indicated. This Institute is not entitled to issue 'C' or 'D' Form.
9. Specific mention should be made whether the delivery will be ex-stock and how much time will be required for delivery after placing the order.
10. Advance payment is not permissible. However, it can be accepted only against Bank Guarantee of equivalent value.
11. Rates should be given both in words and figures clearly in the quotation. If there is any discrepancy between the words and figure, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to above.
12. Rates should be valid for at least 180 Days.
13. The successful bidder shall have to furnish an unconditional Performance Bank Guarantee for the article valid till the warranty period from a schedule bank for 5% of

the order value within 30 days of placement of order failing which the contract shall be deemed as terminated.

14. List of clients in India giving complete contract details of the actual user for identical items may be sent along with the Performance Certificate from them.
15. The principle company of Active and Passive components must be a multi-national company operational for at least more than 5 years in India.
16. The principle company of Active and Passive products must be a registered company in India.
- 17. The bidder must use a single brand for all active component and a single brand for all passive component to confirm to the homogeneity of the supply and stock. An undertaking to this effect must be submitted on the bidder's letterhead, dully stamped and signed.**
18. If the vendor have supplied identical or similar equipment to other Labs / Research Institute, the detail of such supplies for the preceding three years shall be given together with the prices eventually of finally paid along with a Price Certificate to the effect that the quoted prices are bare minimum prices applicable to all Govt./R&D/Educational Institutes and you have not quoted the lesser price to any of these Institute applicable to Educational/R&D Institutions.
19. The last date for receiving completed bids shall be strictly adhered to and no offer received after the due date shall be considered. Delayed/Late Tenders will not be considered at all. CPPRI will not be responsible for any postal delay/ loss in transit.
20. The acceptance of the quotation will rest with the Director, CPPRI, who does not bind himself to accept the lowest quotation & reserves the right to reject, or partially accept any or all the quotations received without assigning any reason.
21. The quotations are liable to be cancelled if any of the above conditions are not complied with. Conditional/ Incomplete quotations will also not be accepted.

Annexure of Technical Specifications

(Annexure-I)Technical specifications for OLT		
MAKE & MODEL:		
S. No.	Technical Specifications/ Qualitative Requirements	Compliance
1	System Specification	
	Product must be in 1U height standalone Box	
	Should have at least 2 Nos. of embedded GEAPON ports .	
	Should have 4 Nos. of GE uplinks: 2 SFP and 2 Combo Ports	

	Device should have 3 nos. of open slots for GEAPON modules loaded with 6 Nos. of GEAPON ports.	
	should have Slot for FAN module	
	should have Slot for DC power module	
	All slots should be Hot-Swappable	
	AC/DC dual power redundancy	
	Front access style (except AC power socket)	
	Should have at least 16K MAC Address Table	
	Should support Up to 64 ONU per PON interface	
	Should support 4 LLID per ONU	
	Support FEC	
	Support AES or Triple Churning encryption	
	should be Compliant with IEEE 802.3ah, 802.1d/w	
	Up to 4 Trunking ports for uplink (802.3ad)	
2	L2 Bridge Features	
	Should have at least 16K MAC Address Table	
	MAC aging time editable	
	IEEE 802.1D/W STP/RSTP	
3	Traffic Management and QoS	
	IEEE 802.1p QoS with 8 priority queues per port	
	IEEE 802.1q tag-based VLAN	
	256 static VLAN, up to 4K dynamic VLAN	
	Supports to GVRP, automatic VLAN member registration	
	IGMP v1 & v2	
4	User Security and Authentication	
	L2 isolation in a OLT port	
	Triple Churning per LLID for downstream	
	Traffic Marking/Shaping/Policing	
	ACL-based Frame filtering	
	IEEE 802.1Q/ VLAN-stacking/ VLAN-translation	
	MAC filtering per port, secure access to each port	
	Specific MAC forwarding per port: only specified MAC addresses can access the network (per lock)	
	Limits to the number of MAC address per port	
	802.1x port-based security that prevent unauthorized client access to the network	
	Private VLAN provides security and isolation between ports on a switch that prevent users to snoop on each other's traffic	
	VLAN stacking to provide CVLAN and SVLAN to help separate different user traffic for security concern and also enable the flexible VLAN usage for users	
5	IP Multicast	

	Support IGMP Proxy, Support IGMP Snooping	
	Support IGMP v2, IGMP v3, Support IGMP Group Filtering	
	Support Multicast VLAN	
	Support IGMP Group Filtering	
6	QoS	
	8 H/W Queues in uplink ports, Flow Control, IEEE 802.1p, IEEE 802.3ad, VLAN Trunk, ITU-T Y.1291 (Traffic Classification),	
	Support SLA for Downstream, Support DBA for upstream	
	Queuing Method: SPQ, WRR, SP+WRR hybrid	
7	PON Bandwidth Management	
	DBA support in upstream for each LLID	
	Support editable Rate limiting in downstream	
	Support SLA	
	Support both Static & Dynamic	
	Bandwidth allocation in upstream	
8	Network Administration & Management	
	User name/Password required for Web/Telnet/local console administrators	
	Two-level security by specific SNMP read/write community	
	SSH provides network security by encryption administration traffic	
	Web-based management	
	Telnet CLI	
	SNMP v1, v2c and v3	
	RS-232 local console	
9	Remote ONU Management through OAM Channel	
	Firmware upgrade	
	Status/Alarm report	
	Loop-back tests	
10	Standard Compliance	
	IEEE 802.3ah, IEEE 802.3 Ethernet, IEEE 802.3u Fast Ethernet, IEEE 802.3z Gigabit Ethernet	
	IEEE 802.3x Flow Control, IEEE 802.3ad LACP aggregation	
	IEEE 802.1d Spanning tree protocol, IEEE 802.1w Rapid spanning tree protocol	
	IEEE 802.1Q VLAN tagging, IEEE 802.1p QoS, IEEE 802.1x port authentication, IEEE 802.11 MIB	
11	Hardware Specifications	
	The equipment should be from the ISO 9000, ISO 14000 and ISO 50001 certified manufacturer, all these ISO certificates must be in OEM name. All these certificates must be submitted along-with Tender Document.	
	Wavelength: 1.31um for upstream and 1.49um for downstream	
	Must support distance up to 20km	

	should have 1 no. of 10/100Base-T for out-band management	
	should have 1 no. of DB9 RS-232 for craft interface	
	should have 1 alarm input port	
12	Power input:	
	AC: 100 V ~ 240 V	
	Must have separate slot for DC: -48 V	
	Power Consumption:	
	AC: 90Watt max	
	DC: 80Watt max	
13	Environmental Specifications	
	Operation temperature: 0°C ~ 45°C	
	Storage temperature:-40°C ~ 70°C	
	Operation Humidity: 10% ~ 90% (non-condensing)	
	Storage humidity: Less than 95% RH (non-condensing)	
14	Certification	
	CE, FCC, CSA	
(Annexure-III)Technical Specification PON ONU		
MAKE & MODEL:		
S. No.	Technical Specifications/ Qualitative Requirements	Compliance
1	System Specifications	
	The Device should be compatible with existing Optical Line Terminal	
	Device should have 1 GEAPON interface with SC type connector (IEEE 802.3ah)	
	Should have 1 No. of Gigabit LAN interface	
	Should support Wavelength: 1310 nm for upstream and 1490 nm for downstream	
	should support Transceiver (with DDMI support):	
	Average output power: 2 dBm	
	Receiver sensitivity: -27 dBm	
	Wall-Mountable	
2	Network Management	
	Supports OAM or data loop back test	
	Supports remote control from OAM channel	
	Device must support Loop back tests	
	Must support Remote firmware upgrade	
3	Feature Support	
	IEEE 802.3ah, IEEE 802.3/u/ab, IEEE 802.1X port authentication	
	IEEE 802.1Q VLAN and IEEE 802.1q VLAN, tag-based and port-based	
	IEEE 802.1p QoS	

	IGMP snooping	
	Broadcast control and Multicast drop/flooding	
4	Security Function	
	IEEE802.1X: AES algorithm with 128-bit encryption key	
	Triple Churning Encryption	
5	Environment Specification	
	Operation temperature: 0°C to 45°C (32°F to 113°F)	
	Storage temperature: -25°C to 70°C (-13°F to 158°F)	
	Operation humidity: less than 95% RH (Non-condensing)	
	Storage humidity: less than 95% RH (Non-condensing)	
6	Certification	
	EMC, FCC Part 15 Class B, CE-EMC Class B and CSA-International	

(Annexure-IV) 2 Core Droplet Single mode optical fiber Cable

MAKE & MODEL:

S. No.	Technical Specifications/ Qualitative Requirements	Compliance
1	Characteristics	
	Attenuation @1310nm: <0.35 dB/km	
	Attenuation @ 1550nm: <0.22 dB/km	
	Chromatic dispersion 1285-1330nm: <3.5 ps/nm.km	
	dispersion @1550nm: <18.0 ps/nm.km	
	Cut off wave Length: <1260 um	
	Polarisation mode dispersion: <0.2 Ps/root km	
	Mode field diameter @ 1310 nm: 9.3+/-0.4 um	
	Core-clad concentricity error: <0.9 um	
	Cladding Non circularity: <0.9 um	
	Cladding Diameter: 124+/-1.0	
	Jacket outdoor Diameter: 3.0 *5.3 +/- 0.2 mm	
2	Mechanical & Environmental Properties	
	Max. operating tension –Long term: 200 N	
	Max. installation tension –short term: 400 N	
	Crush Resistance: 2000 Newton/100cm	
	Minimum Bending Radius: Temporary -15D	
	Max. Operating / Installation temperature: 20 oC +60 oC	
3	Physical & dimensions Properties	
	Steel wire for strengthening the cable tensile	

(Annexure-V) 6 Core Single Mode Armoured Optical Fiber cable

MAKE & MODEL:

S. No.	Technical Specifications/ Qualitative Requirements	Compliance
1	Characteristics	

	Attenuation @ 1310nm = ≤0.35dB	
	Attenuation @ 1550nm = ≤0.25dB	
	Fiber core diameter(um) = 9.2+/-0.4	
	Cladding diameter(um) = 124.8+/-1.0	
	Cladding out of roundness(%) = <6.0%	
	Cut-off wavelength(nm) = <1260	
	Cable structure Integrity and appearance	
	Jacket outer diameter = 8.5±0.3mm	
2	Mechanical & Environmental Properties	
	Steel Tape and steel wire strength member	
	outer dia 10.1 mm	
	Minimum band static 10xD temporary 20xD	
	Maximum tension for Short term 1500N , Long term 600N	
	Operating temperature range : -20 to +60Deg C	
(Annexure-VI) Fiber Patch Cord (Single-mode)		
MAKE & MODEL:		
S. No.	Technical Specifications/ Qualitative Requirements	Compliance
1	TRANSMISSION PERFORMANCE ANSI/TIA/EIA-568-C.3: insertion and return loss (100% tested)	
2	TRANSMISSION MEDIA Optical fiber: 9/125-µm single mode (OS1) optical fiber	
3	CONNECTOR TYPES Connector type: ST/SC/LC/FC/MT-RJ UPC single mode	
	ST/SC/LC/FC APC single mode	
	FOCIS (ANSI/TIA/EIA-604) compliant	
4	CONSTRUCTION simplex or duplex fiber cordage	
	- thermoplastic outer jacket (OFNR-rated)	
	- thermoplastic strain relief	
5	TRANSMISSION PERFORMANCE Return loss: UPC: ≤ -50 dB	
	APC: ≤ -60 dB	
	Insertion loss: ST, SC, LC, FC: typical - 0.2 dB, max - 0.3 dB	
	MT-RJ: typical - 0.3 dB, max - 0.5 dB	
6	MECHANICAL Connector ferrule: ceramic	
	End-face radius of curvature: 10 mm (0.39 in) < R < 30 mm (1.18 in)	
	Apex offset: < 50 µm	
	Cable material: PVC OFNR	
	Cable jacket colour: yellow	
7	ENVIRONMENTAL Operation temperature: -20 °C to +70 °C (-4 °F to +158 °F)	
	Storage temperature: -40 °C to +80 °C (-40 °F to +176 °F)	
	Humidity: 95 %RH (non-condensing)	

8	COMPLIANCE ANSI/TIA-568-C.3, ISO/IEC 11801 2nd Ed., CENELEC EN 50173, UL94V-0	
(Annexure-VII) SMB		
MAKE & MODEL:		
S. No.	Technical Specifications/ Qualitative Requirements	Compliance
1	Wall SMB	
2	L X W x H- 86 mm x 86 mm x19mm	
3	Splice slot capability- 2 fibers / 1 trays	
4	Adaptor capacity- 2 SC simplex or 2 LC duplex Loaded with 1 SC adaptor	
(Annexure-VIII) Single mode Pigtails with SC Connector		
MAKE & MODEL:		
S. No.	Technical Specifications/ Qualitative Requirements	Compliance
1	Type: 9/125 μm OS1 fibre performance	
2	Cordage Outer Diameter: 2.0mm \pm 0.1mm x 4.1 \pm 0.2mm	
3	Buffer Diameter: 900 μm	
4	Primary Coating : 245 μm	
5	Jacket Material: PVC	
6	Operating Temp: -10°C to +60°C	
7	Connector Insertion Loss: 0.30dB(Max)	
(Annexure-IX) Fiber Patch Panel		
S/N	Item and Description	
2	Should be 19 Inch Rack mountable / Wall mount 24 port fiber patch panel	
3	Provision for cable anchoring; cable straps should be included	
4	Cable realer with minimum bend radius	
5	Cable entry from rear, top or sides. Radius controlled cable routing.	
6	Should have fixed termination tray	
7	Should have front Access to cable connectors.	
8	Should be heat resistant, high impact plastic parts.	
9	Should have printed panels for easy identification of port number	
10	Should be loaded with 24 SC - SM adaptors	
(Annexure-X)Technical Specifications for Splitters, 1:4 & 1:16		
MAKE & MODEL :		
S. No.	Technical Specifications/ Qualitative Requirements	Compliance

1	Should have low excess loss	
2	Should have uniform power splitting	
3	Should be compact in size	
4	Should be excellent environmental stability	
5	Insertion Loss for the splitter should not be more than 7.6 dB for 1:4 splitters, and 14dB for 1:16 splitter	
6	Uniformity for 1:4 splitter 0.7dB and for 1:16 splitter 1.2dB	
7	PDL should not be more than 0.2 for 1:4 splitter and 0.3dB for 1:16 splitter	
8	Return loss or directivity should be equal to 55 dB max	
9	Storage Temperature (°C) -40 to +85	
10	Operating Temperature (°C) -40 to +85	
11	Should be without connector	

(Annexure-XI) Technical Specification for Fiber enclosure

MAKE & MODEL:

S. No.	Technical Specifications/ Qualitative Requirements	Compliance
1	Provision for 24Fiber	
2	Provision for cable anchoring; cable straps must be included	
3	Should have stackable splice tray.	
4	Should have separate access to cable and splice tray areas	
5	Should be heat resistant, high impact plastic parts.	
6	Should be complied with IP 55 rating	
7	Should be complied with IP 55 rating	
8	Should have enough space for cable storage	
9	Should have built-in lock for security	