

QRs OF TACTICAL OFC (ARMOURED) WITH COUPLER

S No	Parameter	Specification
1.	Standard	ISO 9001-2000 and ISO 14000
2.	Type and No of fibers	Single Mode Armoured, Min 02 Core. Single mode fiber used in manufacturing field optical fiber cable shall be as per ITU-T Rec G. 652.
3.	Length of Cable	Drum of 1000 mtr with hermaphroditic MIL grade jointing connector at each end. (a) Connector loss at 1310 nm should not be more than 1dB. (b) Connectors should be crush resistant, fully water tight dust protected and maintenance free. (c) Connectors should be based on plug and play concept to reduce installation time. (d) Cable should have requisite patch panel to connect them with the primary Mux, based on plug and play concept at both end of cable.
4.	Wave length	1310/1550nm
5.	Attenuation	Max 0.36 dB/Km – 1310 nm Max 0.25 dB/Km – 1550 nm
6.	Bending Radius(minimum)	
	(a) Short term	< / = 4.6 cm
	(b) Long term	< / =10 cm
7.	Tensile strength	>900N
8.	Temperature range	
	(a) Operation temperature	- 20° C to + 60° C or better
	(b) Storage temperature	- 30° C to + 65° C or better
9.	Cable outer diameter	< 6 mm
10.	Crushing resistance	> 1000 N/cm
11.	Breaking Load	> / = 3500 N
12.	Water pressure	>/ = 500 bar
13.	Armouring	Stainless steel wire / sheet
14.	Accessories	(a) Field repair kit (b) OFC jointing Kit at a scale of one jointing kit per 5 Km of Tactical OFC. (c) One OTDR for localizing fault of cut, Kink, disconnection and connector fault per loc. (d) Light weight metallic spools which are rust and corrosion proof. (e) Light weight back pack carrying Harness and vehicle Mountable stand for deployment and Cable reminder, which are corrosion resistant. (f) Pigtaills:- 5 Mtr, 2 MN. (g) '0' Db pad.
15.	Weight	Maximum 30 kg for 1000m ($\pm 10\%$)

QRs OF TERMINAL EQUIPMENT

S. No	Parameter
1. PRIMARY MUX	
(a)	Optical Interface - Minimum Two Wavelength :- 1310nm / 1550nm
(b)	CPU Card: Minimum Two
(c)	E -1 Interface. - Minimum two
(d)	Ethernet Interface- Minimum two Interface 10/100/1000 Base T Connectors – RJ 45
(e)	Voice Interface - Minimum Six each FXO Card: FXO port 16/32 Port FXS Card: FXS port 16/32 Port
(f)	Interface - Minimum 16 slot Rack 1
(g)	Inbuilt Redundant power supply
(h)	Should support ITU-T G-703, G-742 G-823, G.957, G.958 and IEEE 802.3
(i)	Should support for long haul (20 Kms) transmission without regeneration
(j)	It should conform to L2A table of JSS:55555 and MIL STD 461D
(k)	It should support A/D and D/A conversion
(l)	Should support caller ID Display system, Tone and voice display and Pulse dialing
(m)	Support: Control of adjustable attenuation of each Tx/Rx 2W/4W channel step of 0.1 dB
2. OPTIMUX - 4 x E1	
	GENERAL
(a)	The Optimux system should be capable of multiplexing min 4E1 (2048 x 4) signals and Ethernet Data for transmission over optical fiber.
(b)	The Optimux should not require any repeaters for transmission over fiber for a minimum distance of 50 Kms
(c)	Support for 1 +1 line protection.
(d)	Equipment should not be more than 2U in height.
(e)	4 x10/ 100 Base T supporting 4 independent Ethernet end to end connectivity.
(f)	Local and remote loop backs for optical line and each E1 link
(g)	Selectable gain of 12 db or 30 db
(h)	Local and remote performance indicators
(j)	Console port for management .
(k)	Built in LCD display and LED indicators for indicating various functions, like power , like power on, Alarm , etc.
(l)	E 1 Line Interface (i) Line Rate 2.048 Mbps +/-50 ppm (ii) Line code AMI/ HDB3 (Selectable) (iii) Input signal ITU – T G 992.3 G .703 (iv) Jitter ITU - T G. 992 .3 G.823 (v) Framing ITU – T G.992.3 G. 704 (vi) Connector BNC and RJ 45 (vii) Output Signal ITU – T G. 992.3.G.703 (viii) Impedance 120 Ohm balanced and 75 Ohm Unbalanced.

(J)	Specifications for Optical Termination								
	<ul style="list-style-type: none"> (i) Should support optional redundancy on the uplink (ii) Should support data rate of 155.52 Mbps ± 20ppm (iii) Should support SC to FC Connectors as an option. (iv) Should support Single mode, Multimode and Single Fiber as an Option. (v) Should support Laser Diode as Optical Source. (vi) Should support 850 nm, 1310nm options for Multi-mode optical fiber & 1310 nm, 1550 nm for Single- Mode & Single -Fiber options. (vii) Should support Long haul Laser transmitter Source for longer range up to 120 km as an option 								
(k)	User Ethernet port								
	<ul style="list-style-type: none"> (i) Should support minimum four 10/100/1000 Mbps throughput with addition of 4 E1's (ii) Should support 4 10/100/1000 Base Tx, comply with IEEE802.3 u 10Base- T and 802.3 u 100Base-tx. (iii) Should support Auto negotiation, Half/Full Duplex operation. (iv) Should support MDI/MDIX auto- negotiation. (v) The connector should be RJ45 shielded. (vi) Should be compatible with IEEE 802.3x (vii) Should support Bridge functions. (viii) Should Frame size up to 1536 bytes. (ix) Should support MAC address table per port (x) Should support IEEE 802.1Q VLAN, QinQ, 802.1R ,QoS, DSCP,4 priority queues per port, Rate limiting. (xi) Fully isolated Ethernet Ports without MAC learning. (xii) VLAN based and 802.1Q Tag based. (xiii) Port Link aggregation. 								
(l)	V.35 Interface								
	<ul style="list-style-type: none"> (i) Should support four port V.35 card in the same slot of E 1's. (ii) This card should support data rates of 64 Kbps to 2048 Kbps. (iii) Should conform to relevant ITU standards on the V35 port. (iv) Should support HDB26 Female type connector. 								
(m)	POWER								
	<ul style="list-style-type: none"> (i) Should support 100V to 260 AC power option. (ii) Should support- 36 V to 72 V dc power supply (iii) Should support optional 18V to 36 V DC power supply. (iv) Should support power supply redundancy. (v) Should support AC & DC power supply in single box. (vi) Should not consume more than 10 watts. 								
(n)	Environmental And Physical								
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Operational temperature</td> <td>0 to 50°C</td> </tr> <tr> <td>Storage</td> <td>20 to 70°C</td> </tr> <tr> <td>Humidity</td> <td>20 % to 80 % without condensation</td> </tr> <tr> <td>Mounting</td> <td>should be 19" rack mountable, 1 U size</td> </tr> </table>	Operational temperature	0 to 50°C	Storage	20 to 70°C	Humidity	20 % to 80 % without condensation	Mounting	should be 19" rack mountable, 1 U size
Operational temperature	0 to 50°C								
Storage	20 to 70°C								
Humidity	20 % to 80 % without condensation								
Mounting	should be 19" rack mountable, 1 U size								
(o)	Compliance With EMI/EMC								
	EN 50082-1, EN 55022, IEC 60950 marked with ISO 9001.								

3. MINIMUM 16 LINE SUBSCRIBER EXTENSION DEVICE (EPABX)	
(a)	No of Extensions : 16
(b)	No. of junctions : 08
(c)	No. of Expandable Ports : 96
(d)	Operator's Console : 01
(e)	Compatible : ISDN
(f)	<p>Features :</p> <ul style="list-style-type: none"> ISDN interface card (PRI) E 1 Card. Hot Stand By card for PSU Hot Stand By card for CPU Caller identification facility for Digital phone on extensions. Digital Phone with display with 8 programmable keys IP Gateway card for 16 channels 2 X IP PHONE with display 5 X Push Button CLI Phone (Speaker). GSM Card for 4 Nos. GSM SIM GSM Gate Way 2 Ports.
(g)	The EPABX system should be Digital Microprocessor based stored program control with latest Software Version. It should have facility to connect Computer Terminal, Telephone, and Paging System through suitable Interface common to all such devices.
(h)	The system shall be capable of working in a suitably ventilated non-air conditioned environment. System design shall be immune to noise from various sources like power supplies, lighting system etc.
(i)	All components should be rated for continuous operation of the system. It should be designed in such a way that any damage in any circuit / subassembly / assembly should be self-containing and should not propagate to other parts of the system.
(k)	<p>The equipment shall be capable of working under the howling line & junction limits as under:</p> <ul style="list-style-type: none"> (i) Extension loop resistance of 600 ohms for small systems. (ii) Junction Loop up to 1800 ohms (iii) Insulation lower limit 20 k ohms.
(l)	There must be protection of EPABX System from high voltage / current transient occurring on junction lines to the Exchange.
(m)	Cabinet design shall provide for adequate ventilation to dissipate heat due to energy loss.
(n)	The points for connecting supplies, the power supply to the different plug-in cards shall be standardized & mechanically interchangeable to prevent damage due to accidental interchange of cards
(o)	Power Supply : The EPABX shall be suitable for operation on 230 V \pm 10%, 50 \pm 2 Hz AC and on 48 V DC power supply. Power back up for system to be provided by external UPS for minimum 30 minutes which will also be provided along with the system.
(p)	<p>Conditions:</p> <ul style="list-style-type: none"> (i) Equipment in required in ready to use condition for above configuration. (ii) Equipment with higher configuration due to its basic design or configuration will be acceptable. (iii) Primary MUX should preferably be TEC/TAC approved.

4. RUGGEDISED DATA TERMINAL	
(a)	<u>Processor</u> : Intel i5 or better.
(b)	<u>Motherboard</u> : Intel QM 57 / QM 67 or higher, Express Chipset motherboard
(c)	<u>RAM</u> : 4 GB expandable to 8 GB DDR 3.
(d)	<u>Hard Disk</u> : 500 GB or higher SATA Hard disk heater standard or SSD (Solid State Disc) Hard disk drive should be removable by user.
(e)	<u>Key Board</u> : standard.
(f)	<u>Screen size</u> : 13 inch (33 cm) or higher LCD with touch screen, sunlight readable with brightness level 1000 NITS minimum.
(g)	<u>Battery backup</u> : Minimum 6 hours
(h)	<u>Operating System</u> : Window 7 Professional or higher
(i)	<u>Ports & Interfaces</u> : RJ 45, Serial 2 x USB, Port Replicator Interface, VGA out, audio in / out conforming to IEEE 802.11 a/b/g/n, 10/100/1000 Gigabit NIC, Blue tooth Slot, Fire wire port / suitable port to connect digital camcorder for live viewing and transmission.
(j)	<u>Weight</u> : Not more than 4 Kg
(k)	<u>Environmental conditions and requirements:</u> Each model of laptop offered shall be tested to prove compliance to following Environment test conditions for drop vibration, water resistance, dust resistance, altitude, low temperature, high temperature, humidity and explosive atmosphere to MIL STD 810-G and for EMI / EMC to MIL STD-461F at a MIL approved laboratory as detailed hereunder and test reports shall be furnished at the time of registration and inspection.
5. FCBC	
(a)	<u>Special Features:-</u>
	(i) Modular System, easy for Maintenance. (ii) Hot Plug-In Modules (iii) Wide Input Voltage Range (iv) Active Current Sharing (v) Power Factor Correction (vi) Input High Voltage Disconnect (HVD) & Battery Low Voltage Disconnect(LVD) (vii) Eqpt should have LCD display
(b)	<u>Input specification</u>
	Nominal voltage - 230 V AC, Single Phase Voltage Range - 150-275 V AC Switching Frequency - 47-53 Hz Input Current - <24 A RMS Power Factor - 0.98 MIN.(50% load to 100 % load) Efficiency - >90 %
(c)	<u>Output Specifications</u>
	Nominal voltage - 48VDC Output Voltage Span Adjustment - 48V- 56 V Output current - 3 x 25 A (MAX) Power - 3 x 1400 W(MAX) Net regulation - ± 0.5 V Audible Noise - < 50 dBA Charging capacity - To charge two banks simultaneously (200 AHC)

(d)	Alarms Led Display:-
	AC fail Battery low AC ON Battery Reverse Module Fail LOAD ON Battery ON System On Float System On Charge
(e)	Protections :-
	Following protections shall be provided:- (a) AC input MCB of adequate rating. (b) DC output MCB for 48 Vs (c) DC over load protection (d) DC over charge protection (e) DC under voltage protection. (f) Battery reverse polarity protection. (g) Fast acting fuse at the input of each SMR module (i.e, rectifier circuit) (h) Over Temperature Protection
(f)	Type of Batteries:-
	2V VRLA sealed maintenance free batteries of international standard with a life of 3 years or 4000 cycles (minimum) with following characteristics:- (i) Stackable without loss of capacity. (ii) Compact and Space saving. (iii) Low self discharge. (iv) <u>Container.</u> Hermetically sealed, reinforced flame retardant polypropylene co-polymer, light weight and sturdy container with weatherproof cover using long lasting engineering plastic. (v) <u>Separator.</u> Spun glass micro porous matrix with high porosity and highly absorbent type. (vi) <u>Electrolyte.</u> Sulphuric Acid completely absorbed in separator, immobilized and spill proof. (vii) <u>Positive Plate.</u> Flat pasted type with hybrid Lead alloy to impact deep discharge capability, long life and low self discharge properties to the grid. (viii) <u>Negative Plate.</u> Flat paste type with Lead Calcium alloy to impart maintenance free properties to the grid. (ix) <u>AH Capacity.</u> 300 AH. (x) <u>No of Batteries.</u> 24 Nos to provide 48 V battery bank. (xi) <u>Safety Valve.</u> Pressure regulated, self re-sealing and explosion proof. (xii) <u>Terminals.</u> Lead terminals with highly conductive Copper inserts ensuring high discharge characteristics.
(g)	Salient Feature :-
	The salient feature of VRLA batteries shall be:- (i) Rugged construction. (ii) Lighter and easy to install (iii) Safe and explosion proof (iv) No filling and initial charging required at site. (v) Never requires topping up (vi) High energy density (vii) Deep cycle, high rate discharge and recharge capability.
	(viii) Warranty:- Three years.

6. UPA 2 KVA Online 60 Minutes Backup	
(a)	<p>General</p> <p>(i) UPS shall be free from workmanship defects, sharp edges, nicks, scratches, burrs, etc. All fasteners shall be fixed properly. The equipment shall be complete with all parts and all parts shall be functional.</p> <p>(ii) Enclosure shall confirm to protection requirement of IP2L1 to ISS/ IEC 60947 Part -1)/ 2004.</p> <p>(iii) By pass facility shall be provided for maintenance of UPS.</p> <p>(iv) UPS shall supply output power and charging current at the same time.</p> <p>(v) Switching device shall be MOSFET or 1 GBT and the same shall be confirmed in their offer.</p> <p>(vi) Switching frequency shall be above 15 KHz and shall be declared in their offer.</p> <p>(vii) Crest factor of UPS shall be 3:1.</p>
(b)	KW rating of the UPS shall be 0.70 times the KVA rating.
(c)	Input a : 160V -260V, 50+/- 3% Hz single phase AC.
(d)	Output a : 230V +/-1% (with alternative setting for 220V +/- 1%) 50 +/- 0.5 Hz, Single Phase.
(e)	Total Harmonics distortion at output : 2% maximum for UPS up to 5 KVA and 3% maximum for UPS above 5 KVA on resistive load, when total input harmonics are less than or equal to 10%.
(f)	Efficiency (at rated KVA output m rated Pf and rated output voltage and frequency)
	(i) Over all efficiency (minimum) : 90%
(g)	UPS Power factor at rated load : better than 0.95 lagging.
(h)	Over load : UPS shall withstand 20 % overload for 10 minutes and 50 % over load for one minute.
(j)	UPS should be capable to be configured in 1 +1 parallel redundant configuration for rating of 5 KVA and above (on line UPS Rack Mountable Type)
(k)	Protection: Following protection shall be provided in UPS:
	(i) Over voltage, short circuit, and overload at UPS output terminal.
	(ii) Under voltage at battery terminal.
	(iii) Over shoot and under shoot shall not be greater then 4 % of rated voltage for duration of 40 m sec (Maximum).
(l)	Indicators and meters : Following indicators shall be provided :
	(i) Main presence.
	(ii) Battery charging and discharging
	(iii) Output overload.
	(iv) Low battery voltage.
(m)	<p>Battery Bank:</p> <p>(i) UPS shall be supplied with 12 volts SMF VRLA batteries as per JISC:8702 only.</p> <p>(ii) All rating of batteries shall be type tested from a central Govt. lab or NNABL/ ILAC approved lab for all tests. In cases where interim test report covering all other tests except endurance test is available, same shall also be acceptable, provided endurance test for the same batch of battery is under progress in a central Govt. lab or NABL/ ILAC lab.</p> <p>Tenderers having valid endurance test report for any one rating of SMF VRLA battery shall be deemed to be having valid endurance tests report for all ratings of SMF VRLA battery, provided that each rating is of identical design like same size & weight of plate and volume of cell per AH rating.</p> <p>(iii) Number of samples for type testing shall be as per IS: 7372/1995 with amendment 1 to 3.</p>

(iv) As a proof of type testing, tenderers can also produce valid registration certificate of OEM indicating registration of item to JIS C 8702 part 1,2,& 3 .

(v) Tenders shall declare battery AH capacity, battery voltage, number of batteries of each rating, make and model of batteries offered with each item of UPS against questionnaire of technical particulars.

(vi) The UPS shall be complete with Trolley for battery bank, battery, Cables and connectors etc, and the firms shall also connect the batteries with UPS and do commissioning of the same.

(vii) Minimum VAH rating battery bank for different duration of backup time shall be as detailed below:-

<u>UPS Rating in 1 KVA</u>	<u>Min. VAH</u> <u>60 Minutes</u> <u>back up time</u>
2 KVA	3200