No.IV-17017/13/06-Prov.I
Ministry of Home Affairs
Prov.I
-0-

New Delhi the 9th June,2006

To

The DGs:Assam Rifles/BSF/CISF/CRPF/ITBP/NSG/SSB/BPR&D.

Subject: Finalization of QRs/Specifications for Weaponary/securityEquipments

The Sub-Group constituted by MHA vide Memorandum No. .IV.17017/18/2001-Prov.I dated 5-7-2002 for laying down QRs/specifications of various items/equipments has since submitted its recommendations in respect of following weaponary/security equipments:

(i) Digital HF Transceiver
(ii) Networking(NSG)
(iii) VHF/UHF Portable monitoring receiver
(iv) Broad band satellite terminal

2. These recommendations have been accepted by MHA. The QRs finalized by the Sub-Group and accepted by MHA in respect of the above equipments are enclosed herewith.

3. Henceforth, all the CPMFs should procure the above items required by them to meet their operational needs strictly as per the laid down QRs/specifications.

Yours faithfully,

(Alok Mukhopadhyay)
Under Secretary(Prov.I)
Tele. No.23381278

Copy to : DD(Procurement), MHA

Copy for information to:

1. PS to JS(PM), MHA
2. Dir(Prov), MHA

UTILITY OF EQUIPMENT :

(i) DIGITAL HF TRANCEIVER

World is moving from analog to digital and there is a need to introduce HF digital radio sets in the force. The analog technology of HF communication suffers from many limitations like noise, susceptibility to interception, instability of links etc. Digital technology addresses these problems by providing improved signal quality, affords greater security through digital encryption and frequency hopping ad gives more efficient links through ALE features. Army is already using digital HF sets.

(ii)NETWORKING

NSG has unique roles of counter terrorist (CT), counter hijack (CH) and VIP protection which demand mobilization of force and conduct of operation on very short notice. The reliable communication is the quintessence of its success. The NSG is distributed at three separate locations at Palam, Manesar & Samalkha. The networking involves inter connectivity of communication networks and data network between these locations to ride on one 'converged platform' to speed up coordination, planning, decision making and mobilization of task force the additional utility of this converged network will be :-

a) (i) Communication and data network down to unit level.
(ii) Facilitating use of computers by all the units to implements e-governance policy of MHA.
(iii) OFC is capable of providing high order of band-width, and superior quality of service. Due to its suitability for multiple applications, it has been preferred as media within the NSG cantonment.

b) Block diagram of the voice and data networking is enclosed with framed QRs at page 38 to 40.

(iii)VHF/UHF PORTABLE MONITORING RECEIVER

Proposed portable monitoring receiver will be utilized at operation site for monitoring of VHF/UHF radio transmissions of terrorists/anti social elements for gaining information NSG has been entrusted with very important task of counter terrorist and counter Hijack operations. It is experienced that anti national elements/terrorists very extensively use VHF/UHF radio communication before and after launch of any terrorist attack. They also extensively use radio comn. during conduct of counter Hijacking and counter terrorism operations by NSG TF against them for passing info. and obtaining directions from their mentors. Monitoring of messages being passed by terrorists to their mentor and/or instructions being received by terrorists from their mentors would undoubtedly be of immense utility of NSG TF in reshaping of action plan and conduct of operations.

(iv)**BROAD BAND SATELLITE TERMINAL**

NSG is a Federal contingency force of Govt. of India responsible for conducting counter Hijacking and counter terrorism operations any where in the country. Area of operation for NSG is not defined. It may be sent even to those areas where no landline or cellular phone facility is available. NSG TF on reaching site of operation should be in constant communication with HQ NSG Delhi and NSG FHQ at Manesar for keeping IG (OPS), DG NSG and in turn MHA inform the progress of operations and obtain directions depending upon the situation till leaving site after completion of the operation. The operation site may be any where closer to (within UHF/VHF comn range) or away from (beyond the VHF/UHF communication range) HQ NSG Delhi. As HF communication does not a support transmission of broad band data (256 Kbps). Satellite communication is the only means of communication left for keeping NSG TF in constant voice & Data communication with HQ NSG Delhi and Force HQ at Manesar.

AVAILABILITY OF VENDORS

It is also confirmed that QRs of the above mentioned communication equipment have been formulated in such a manner that there would be sufficient vendors for each equipment available in the market.

QRs OF NETWORKING

1. Schematic diagram showing networking except for external connections is given at Appendix 'J'. 2 MB lines is to be provisioned and equipment installed by vendor(where required) for external connections from BSNL/MTNL. The project will be a 'Turn Key Project.

2. The list of items which are needed (some of them may be inbuilt/ combined in an equipment) for networking are as follows:-

Sl No	Equipment	Purpose	Specifications
(a)	VOIP Switch	To segregate 2 Mbs bandwidth to facilitate processing of Voice and Data over IP.	Appendix 'A'
(b)	DXC Consisting of Power supply Unit with Ring generator, Control Unit with 4 X E1 2.048 Mbps, 2 FXS ports, 2 FXO Ports, 1 V.35 Port, connectors and user network management devices, UPS	To facilitate digital cross connect of voice and data channels .	Appendix 'B'
(c)	L3 Switches 24 10/ 100/1000 Base T ,UPS	For interconnecting LANs of HQ and/or units.	Appendix 'C'
(d)	L2 Switches 24 10/100 Base T,UPS	To extend LAN (of HQ/or unit) connectivity to clients.	Appendix 'D'
(e)	HDSL Modem	To transport 2 MB on existing JFC for interconnecting LANs of HQ and/or units.	Appendix 'E'

Sl No	Equipment	Purpose	Specifications
(f)	OFC Laying and LAN	To extend WAN connectivity at distances beyond the capability of JFC	Appendix 'F'
(g)	Fiber Optical Mux	To extend independence LAN /WAN to Trg Centre & FHQ from Manesar	Appendix 'G'
(h)	UPS 1 KVA	To provide stabilized power supply to L2 and L3 switches	Appendix 'H'

Appendix 'A'

(refers to Page 1 Ser 2 (a))

QUALITATIVE REQUIREMENT FOR VOIP SWITCH FOR NSG INTRANET

Sl No	Parameter	Specification
1	General	Multilayer switch, Enterprise-class intelligent services delivered to the network edge,
2	Interfaces	
	(a) Telephone Interfaces	RJ 11
	(b) Life Line	Automatic cut through of a single analog line in case of power failure
	(c) Network Interface	10/100 Base-T, RJ-45
	(d) Indicators	Channel status and activity leds
	(e) Voice Ports	12 Ports
3	Voice, Fax & Modem	
	(a) Voice over Packet Capabilities	G.168-2000 compliant Echo Cancellation, VAD, CNG, Dynamic programmable Jitter Buffer, modem detection and auto switch to PCM
	(b) Voice Compression	G.711, G.723.1, G.726, G.727, G.729A
	(c) Fax over IP	Group e fax relay up to 14.4 kbps with automatic fallback, T.38 compliant
4	Signaling	
	(a) Signaling	FXS Loop Start
	(b) In-band Signaling	DTMF (TIA 464B), User defined and call progress tones

	(c) Control	MGCP (RFC 2705), H. 323(V4), SIP (RFC 3261), Audio Codes VoIP Library API
	(d) Provisioning	BootP, DHCP and call progress tones, Remote management using Web browser, EMS (Element Management Sys), Syslog support.
5	Caller ID	Bellcore Type 1 &2, ETSI NTT and DTMF based CID
6	Polarity Reversal	Immediate or smooth to prevent erroneous ringing
7	Metering Tones	12/16KHz Sinusoidal bursts
8	Distinctive Ringing	By Frequency (15-100 Hz) and cadence patterns
9	Message Waiting Indication	DC voltage generation (TIA/EIA-464-B), V23 FSK data, stutter dial tone
10	Physical	
	(a) Power	90-260 VAC/47-63 Hz
	Environmental Condition.	
	(a) Temperature	
	(i) Operating	0° to 45 deg. C
	(ii) Storage	-25° to +70 deg C
	(b) Relative Humidity	
	(i) Operating	10 to 85%(non condensing)
	(ii) Storage	10 to 85% (non condensing)
	(c) Dimensions (HxWxD)	44 x 220.3 x 240 mm
	(d) Mounting	Wall mount, rack mount and table top

Appendix 'B'

(refers to Page 1 Ser 2 (b))

QUALITATIVE REQUIREMENT FOR DIGITAL CROSS CONNECT MULTIPLEXER (DXC)

Sl No	Parameter	Specification
(a)	(b)	(c)
1	**General**	Digital cross connect multiplexer (DXC) will be used to multiplex or demultiplex and cross-connect N X 64 Kbps voice and data channel to 2 Mbps to connect LAN and WAN using routers , switches, EPABX and Digital Telecommunication equipment.
2	**Technical**	
	(a) Type of equipment	The DXC should be a chassis based equipment.
	(b) No of Universal Slots other than PSU	The DXC should provide 12 Universal Slots other than PSU.
	(c) E1 for network or user interfacing	The DXC Should support min 4 E1 for network or user interfacing.
	(d) Interfacing with different Exchanges through E1 G.703 interface	It should provide easy interfacing with different Exchanges through E1 G.703 interface.
	(e) It should support Power Supply Unit (AC or DC) optional and Controller Card	It should support Power Supply Unit (AC or DC) optional and Controller Card.

Sl No	Parameter	Specification
3	**Interfaces** The following interfaces should be available :-	
		(a) V.35 supporting 1920 kbps (n x 64 kbps)
		(b) Ethernet Port 10/ 100 M bps
		(c) FXO/FXS
		(d) E&M
		(e) Quad E1 G.703 2 Mbps balanced/unbalanced
4	**E1 Interface** **E1 interface should comply to the following :-**	
	(a) Bit rate	Yes2.048 Mbps+/- 50ppm
	(b) Line Code	HDB3
	(c) Signaling	CAS
	(d) Jitter & Wander	G.823
	(e) Protection	1+1 APS (optional)
	(f) Line option	75/120 ohm
5	**FXO Interface** **FXO interface should comply to the following :-**	
	(a) Standard	E1A RS-464 Loop Start (2 Wires)
	(b) Off-Hook	Off-Hook
	(c) AC Input Impedance	600 ohm
6	**E&M Interface**	
	(a) Standards	EIA RS-464 Type I, or Type V; 2 wires or 4 wires
	(b) Impedance	Nominal 600 ohm

Sl No	Parameter	Specification
7	**Synchronous data interface Should comply to the following**	
	(a) Standard	V.35
	(b) Data rate	1920 kbps (n x64)
8	**Ethernet Interface**	
	(a) Standard	IEEE 802.3
	(b) Data rate	10 /100 Mbps
9	**Integrated Network Management & Diagnostics.**	
	(a) Integrated Network Management and highly flexible Network and user Interface.	(a) Integrated Network Management and highly flexible Network and user Interface. It should provide grooming of channels from various networks that saves bandwidth and floor space
	(b) Network Management & Diagnostics.	(b) Network Management & Diagnostics. Enhanced diagnostics including loop backs, local and remote test and BER tester will be incorporated. The eqpt will also be SNMP manageable. It should also provide remote control and management. It should support following network management devices :-
		(i) Menu driven Hand Held Local Craft Terminal or by using VT-100 Emulation or Telnet.
		(ii) Windows based Net work Mgmt.
		(iii) RS-232, VT-100
		(iv) Console/SLIP
		(v) 10 Base-T, Ethernet
		(vi) In-band 64 Kbps

Sl No	Parameter	Specification
10	**Network Management.** Vendor will provide the following at each location :-	
		(a) User Network Management Device (Speed more than 3 GHz or more, RAM- 1 GBPS or more , Memory- 2 GB, Mobile, 2USB Port, 2PCI Port at each location).
		(b) Connectors
		(c) Man machine interface
11	**Operational Requirements.**	
	(a) Reliability.	(a) Network up time should be more than 99.9%
12	**Safety.**	The equipment will incorporate following safety features: -
		(a) Protection against reverse voltage.
		(b) Protection against over voltage.
		(c) Protection against surges.
		(d) Safety devices to prevent any danger to the operating /repairing personnel on equipment.
		(e) Visual alarm to indicate any critical failure.
13	**Power Supply.**	
	(a) Work on AC or DC	The eqpt will work on AC or DC supply
	(b) Uninterrupted power supply System	Uninterrupted power supply System 1 KVA online with 15 min internal backup.
	(c) UPS capacity	UPS capable 4 to 8 hours backup on external batteries

Sl No	Parameter	Specification
14	**Environmental Condition.**	
	Functional	
	(a) Working Temperature	0-45 deg. C
	(b) Relative Humidity	10 to 85% (Non condensing)
	Storage	
	(c) Storage Temperature	-25 to + 70 deg. C
	(d) Relative Humidity	10 to 85% (Non condensing)
15	**Dimension**	W x D x H (mm)
		W< 482, D<360, H< 225

Appendix 'C'

(refers to Page 1 Ser 2 (c))

QUALITATIVE REQUIREMENT FOR LAYER 3 SWITCH FOR DATA NETWORK FOR NSG

Ser No	Parameters	Specification
(a)	(b)	(c)
1	General	Multilayer switch, Enterprise-class intelligent services delivered to the network edge
2	Intelligence	Layer 3
3	No of 10/100/1000 Base T Ports	24
4	Type of Switch	Fixed
5	Switching Fabric Bandwidth (Backplane)	At least 32 Gbps
6	Forwarding rate	> = 6.5 MPPS
7	No of MAC Address	> = 8000
8	VLANs	> =255
9	No of Multilink trunk	> =4 Trunks
10	Link Aggregation	Should support Link Aggregation Control Protocol (LACP) which allows the creation of Ethernet channeling with devices that conform to IEEE 802.3ad.
11	Auto-negotiation	Auto-negotiation of port speed, duplex and connection (MDI/MUX)to be supported
12	Traffic Control	To be supported

Ser No	Parameters	Specification
13	Spanning Tree Protocol/Rapid Spanning Tree Protocol	Should supportIEEE 802.1W Rapid spanning tree protocol (RSTP). Backward-compatible with spanning tree protocol (STP) Fast-start mode spanning tree enable/disable per port
14	Layer3 switching	Should support Layer3 Wire-speed, non-blocking performance on all ports
15	Layer2 Switching	Should support Layer2 Wire Speed Switching
16	IGMP Snooping	Should support IGMP snooping on layer 2 interfaces
17	Flash Memory	Minimum 8MB
18	No of SFP uplinks slots	Minimum 2 SFP uplinks slots should be available
19	Basic RIP and static routing	Should be supported Basic RIP and static routing, upgradable to full dynamic IP routing
20	Stacking technology	Stacking High-speed stacking bus Innovative stacking technology, 1-RU stackable should be supported
21	Dynamic Host Configuration Protocol	Should support Dynamic Host Configuration Protocol
22	Auto Sensing	24 auto-sensing 10/100/1000 ports and two dual-personality ports for 10/100/1000 or SFP connectivity bays should be available
23	Auto MDI/MDIX-eliminating the need for specific crossover cable	Should support auto MDI/MDIX-eliminating the need for specific crossover cable

Ser No	Parameters	Specification
24	IP Routing	• Should support up to 2,000 external routes, allowing the switch to scale as the network grows-ideal for deployments at the edge of a network using IEEE 802.1w • Stacked units should behave as a single spanning-tree node
25	High-Performance IP Routing	Should be supported
26	QoS and ControlAdvanced QoS	• Cross-stack QoS should allow QoS to be configured across the entire stack.• Should support 802.1p
27	Network wide Security Features	It should support following (a) Port based Access Control Secure Mode (locks MAC address) (b) Implementation of management of the switch using Secure Shell (SSH) and Secure Sockets Layer (SSL/HTTPS) encryption (56 or 168 bit) preventing unauthorized remote access to the switch over IP networks or from a web browser (c) Priority based on : (i) Diffserv code point (DHCP) (ii) IEEE 802.1p Class of service (CoS) VLAN priority Default port priority
28	Network Management.	Network Management. Vendor will provide the following at each location :-
		User Network Management Device (Speed more than 3 GHz, RAM- 1 GBPS or more , Memory- 2 GB, Mobile, 2USB Port, 2PCI Port at each location).
		Connectors
		Man machine interface

Ser No	Parameters	Specification
29	**Connectors and Cablin: It should provide following**	• 10BASE-T ports: RJ-45 connectors, 2-pair Category 5 unshielded twisted-pair (UTP) cabling • 100BASE-TX ports: RJ-45 connectors, 2-pair Cat-5 UTP cabling • Management console port: RJ-45-to-DB9 cable for PC connections
30	**Power Supply**	The eqpt will work on AC
		Uninterrupted power supply System 1 KVA online with 15 min internal backup.
		UPS capable 4 to 8 hours backup on external 12 V 180 AHC batteries
31	**Standards to be supported**	• IEEE 802.3 10BASE-T (ISO/IEC 8802 3, Clause 14) • IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25) • IEEE 802.3u Auto negotiation on Twisted Pair (ISO/IEC 8802-3, Clause 28) • IEEE 802.3x (Flow Control on the Gigabit Uplink port) • IEEE 802.3z 1000BASE-SX and 1000BASE-LX • IEEE 802.1d MAC Bridges (ISO/IEC 10038) • IEEE 802.1p (Prioritizing) • IEEE 802.1Q (VLAN Tagging) • IEEE 802.1D Spanning Tree Protocol • IEEE 802.3ad (manual/static) • IEEE 802.3ad (LACP)† • IEEE 802.1st • IEEE 802.1wt • IETF DiffServ

Ser No	Parameters	Specification
32	**Environmental Condition**	
	(a) Temperature	
	(i) Operating	0° to 45°deg C
	(ii) Storage	-25 to + 70 deg. C
	(b) Relative Humidity	
	(i) Operating	10 to 85% (non condensing)
	(ii) Storage	10 to 85% (non condensing)
33	**Dimensions**	Dimensions (H x W x D) H < 2.59 in, W < 17.75 in, D <11.6 in
34	**Safety Features.**	The eqpt will be protected against: -
		. Reverse voltage.
		. Short/Open Circuit.
		. Lightning

Appendix 'D'
(refers to Page 1 Ser 2 (d))

QUALITATIVE REQUIREMENT FOR LAYER 2 SWITCH FOR NSG INTRANET

Sl No	Parameter	Specification
(a)	(b)	(c)
1	Performance	-
2	General	Multilayer switch, Enterprise-class intelligent services delivered to the network edge,
3	Intelligence	Layer 2
4	No of 10/100/1000 Base T Ports	24
5	Type of Switch	Fixed
6	High Capacity Switching Fabric Bandwidth (Backplane) supporting wire-speed, non-blocking performance on all ports including Gigabit ports.	Atleast 8.8 Gbps
7	Forwarding rate	> = 6.5 MPPS
8	MAC Address	Switch should support Min 8000 MAC addresses
9	VLAN	Min 60 VLANs
10	Multilink Trunking	Should support Distributed Multi Link Trunking

Sl No	Parameter	Specification
11	Link Aggregation	Should support Link Aggregation Control Protocol (LACP) allows the creation of Ethernet channeling with devices that conform to IEEE 802.3ad.
12	Auto-negotiation	Auto-negotiation of port speed, duplex and connection (MDI/MUX) to be supported
13	Traffic Control	Should support Traffic Control
14	Spanning Tree Protocol/Rapid Spanning Tree Protocol	Should support Software upgradeable to IEEE802.1W Rapid spanning tree protocol (RSTP) Backward-compatible with spanning tree protocol (STP) fast-start mode spanning tree enable/disable per port.
15	Layer2 Switching	Should support Wire Speed switching
16	IGMP Snooping	Should support IGMP snooping on layer 2 interfaces
17	Duplex operation	Should support full duplex operation on all ports.
18	Automatic detection	Should support automatic detection of switch in the network by other devices.
19	Configurations with 8/12/16/24 ports of 100BaseTx.	Should support configurations with 8/12/16/24 ports of 100BaseTx.
20	Voice applications	Shall support Voice applications like IP Telephony.
21	Classification of traffic.	Shall support IEEE 802.1p based classification of traffic.
22	Prioritization of traffic.	Shall support port level prioritization of traffic.

Sl No	Parameter	Specification
23	Stackable stacking port	Switch stack should support a mix of 24 Port and 48 Port Switches
24	Resiliency Features	Switch should support Resiliency Features such as Spanning Tree, Resilient Links,
25	Link Aggregation,	Switch should support Link Aggregation,
26	Advanced CoS and Advanced QoS	Switch should support Advanced CoS and Advanced QoS functionality,
27	Management	-
28	Traffic Prioritization,	Switch should support 802.1p for Traffic Prioritization,
29	Queues & Groups of RMON,	Switch should support minimum 4 Queues Per Port & minimum 4 Groups of RMON,
30	Management.	Switch should support Web based, CLI / Telnet, SNMP Management,
31	Power Supply.	
		The eqpt will work on AC
		Uninterrupted power supply System 1 KVA online with 15 min internal backup.
		UPS capable 4 to 8 hours backup on external 12 V 180 AHC batteries
32	Industry Standards Supported	Should support Ethernet Protocol

Sl No	Parameter	Specification
33	**Industry Standards Supported**	Should Support
		Management, including MIBs Supported RFC 1157 (SNMP v1) RFC 1213 (MIB II) RFC 1215 (MIB II Traps) RFC 1493 (Bridge MIB) RFC 1659 (RS232 MIB) RFC 1757 (RMON I) RFC 2021 (RMON II Probe Config) RFC 2233 (Interfaces MIB) RFC 2665 (Pause control) RFC 2668 (IEEE 802.3 MAU MIB) RFC 2674 (VLAN MIB Extension)
		RFC 768 (UDP) RFC 791 (IP) RFC 792 (ICMP) RFC 793 (TCP) RFC 826 (ARP) RFC 854 (Telnet) RFC1350 (TFTP) RFC1542 (BOOTP, DHCP) RFC 2616 (HTTP)
34	**Environmental Condition.**	Environmental Condition.
	(a) Temperature	
	(i) Operating	0° to 45° C
	(ii) Storage	-25 to +70°C
	(b) Relative Humidity	
	(i) Operating	10 to 85% (non condensing)
	(ii) Storage	10 to 85% (non condensing)

Sl No	Parameter	Specification
35	Safety Features.	The eqpt will be protected against: -
		(a) Reverse voltage.
		(b) Short/Open Circuit.
		(c) Lightning.

Appendix 'E'

(refers to Page 1 Ser 2 (e))

QR FOR HDSL MODEM

Sl No	Parameter	Specification
(a)	(b)	(c)
1	**General Feature**	(a) The HDSL modem will be based on DSL technology using 2B1Q or G.SHDSL
		(b) Version - To be quoted
		(c) Should transport 2 MB from MTNL/BSNL premises to NSG EPABX (distance 1.75 Km approx)
		(d) The 2MB data in a form of E1 G.703 can be connected to any digital communication equipment having E1 G.703 interface
		(e) The modem should be able to work on 4W-0.5mm under ground cable at a data rate upto 2.048 Mbps.

Sl No	Parameter	Specification
2	Technical	CONFIGURATION OF CARDS
	It should support following cards :-	
	(a) xDSL Line interface Features	
		(i) Full duplex with adaptive echo cancellation 2B1Q line coding
		(ii) Unconditioned 19-26 AWG twisted pair
		(iii) Line Rate Supported upto 2320 kbps
	(b) E1 (G.703) interface features :-	
	(c) Line Code	HDB 3
	(d) Framing	Unframed
	(e) Transmit level	According to G.703
	(g) Line Rate -	2.048 Mb/sec and N x 64 Kb/s (where N=2 to 32)
	(h) Impedance	(i) 75 ohm coaxl / 120 ohm twisted pair
	(j) Range	4 Km over 2 pair 24 AWG wire
	(k) Connector	G.703
		(l) BNC coax
		(i) 75 ohm for 2048 and 1920 Kbps unbalanced.

Sl No	Parameter	Specification
	(m) Data Rate	2.048 Mb/sec and N x 64 Kb/s (where N=2 to 32)
		G.703-HDB3:128, 256,512,1024 , or 2048 kbps
		(ii) G.703 Codirectiona:64 Kbps
	(n) Diagnostics	
		(i) Loop backs:
		(aa) Local analog loop back
		(ab) Remote digital loop back
		(ac) Local digital loop back
	(o) Performance Monitor (E1)	
	(i) Performance Store	To be supported
	(ii) Monitor Registers	To be supported
	(iii) Performance Reports	To be supported
	(iv) Alarm History	To be supported
	(v) Alarm Queue	To be supported

Sl No	Parameter	Specification
	(n) Standards	(n) One of following Standards should be supported
		ASM-40 operation with the AUSTEL (A95/76A/0020), TUV (E9471050.01), BABT and NET-1 requirements
		For E1-HSDL, ETSI RTR/ TM-03036 and ETSI TS 101 135 (formerly ETR 152)
		ITU Q.991.1
		ITU Q.991.2
3	**Power Supply**	
	(i) Work on AC or DC power supply.	(i) The set will work on AC or DC power supply.
4.	Environmental Condition	Environmental Condition.
	(a) Temperature	
	(i) Operating	0° to 45 deg. C
	(ii) Storage	-25 to +70 deg. C
	(b) Relative Humidity	
	(i) Operating	10 to 85% (non condensing)
	(ii) Storage	10 to 85% (non condensing)

Appendix 'F'

(refers to Page 2 Ser 2 (f))

QR FOR SUPPLY AND LAYING OF OPTICAL FIBER CABLE FOR DATA NETWORK(CAMPUS NETWORK AT MANESAR AND SAMALKHA)

Sl No	Parameter	Specification
(a)	(b)	(b)
1	General.	The sketch of layout of Campus network at Manesar and Samalkha is given in Annexure IV. Optical fiber cable will be used to connect layer 2 switches installed at different unit locations to layer 3 switch/ router at Manesar and Samalkha.
2	Technical Specification.	
	The product supplied will be TEC / ISI approved. The following will be provided:-	
	(a) Single mode optical fiber based on ITU-T Recommendation G.652 will be TEC approved with following important parameters:-	
	(i) Number of Fibers	24
	(ii) Refractive Index	Step Index , Δ = 0.35% Nominal
	(iii) Cut-off wavelength (λc)	(λc) -1150 - 1330 nm
	(iv) Reinforcement	Aramid yarn (s)

Sl No	Parameter	Specification
	(v) Wrapping	Plastic Tape
	(vi) Outer sheath.	
		Material High Density- Polyethylene Coloured Black
		Thickness -Nom. 1.7 mm.
	(b) HDPE pipe.	50 mm dia HDPE pipe.
	(c) GI Pipes.	80 mm dia GI Pipes.
	(d) RCC pipes.	100 mm dia RCC pipes.
	(e) Brick chambers	Brick chambers 1.6 mtr with RCC covers.
	(f) Man Hole	Man Hole on every 2 Km.
	(g) Hand Hole	Hand Hole on every 200m.
	(h) Fiber Termination boxes	Fiber Termination boxes at each locations.
	(i) Fiber distribution frame	Fiber distribution frame at Comn Centre.
	(j) Distribution of one pair of fibre	Distribution of one pair of fibre to each establishment in Star configuration.

Tool

Sl No	Parameter	Specification
3	**Scope of Work. It will include the following:-**	
		(a) Preparation of detailed drawings of OFC route plan as per layout diagram attached in consultation with representative of HQ NSG.
		(b) Submission of approximate bill of quantity for OFC, Pig tails, Fiber termination boxes,Fiber distribution frame, connectors and other items such as GI/RCC pipes, marking indicators etc as per format attached.
		(c) Laying & supply of underground armoured TEC approved OFC cable.
		(d) Cable laying will include excavation of trench up to normal depth of 1.5m in normal soil, 1 m in soft rock and hard rock area, closing of trenches so as to restore it to normal condition. RCC and GI pipes will be required to be put as one or more protection wherever applicable.
		(e) Jointing, testing and commissioning of the complete system with user.
		(f) Obtaining permission for various agencies for excavation of earth/crossing of road or any other permission in relation with laying of cable.
		(g) Any other items of works not covered but which may be essential for the execution of the scheme have to be supplied and installed by the vendor. The tenderer has to bring out the necessity of such items, with justification in his offer.

Sl No	Parameter	Specification
4	**Technical Bid should include following details: -**	
		(a) Tech parameters, TEC, Make & type of cable.
		(b) Technical details of cable.
		(c) Delivery schedule of the cable and other stores.
		(d) Time plan for installation.
		(e) Survey report with approximate quantity of cable / stores required.
5	**The terms and conditions for laying underground cables will be as under :-**	
		(a) The trenching work and laying of cable will be done as per DOT specification.
		(b) The caution boards and information boards will be placed before commencing excavation and will remain fixed till work is completed. The boards will be supplied by the firm.
		(c) Necessary diagram of power and telecom cables / water pipe lines and sewerage line to lay OFC cable will have to be procured by the firm from Construction Squadron at Manesar and CPWD authority at Samalkha.

Sl No	Parameter	Specification
		(d) Work will be inspected by officers of this organization at commencement and at any intermediate stage and on completion.
		(e) Transportation of the cables at the site of the work and back to store dump will be at the cost of firm.
		(f) Cable will be laid in the trenches after testing and inspection by the board of officers of this organization. The specification test results will be provided along with handing/taking over certificate.
		(g) Permission of road cutting from the various departments is to be obtained by the firm.
		(h) The road cuttings will be covered including tarring of the surface by the contractor after completion on the work.
		(i) After laying of cables and completion of work by the contractor the same should be entered in the measurement book and signed by the representative of the unit as well as by the rep of contractor.
		(j) Arrangement regarding security of cable will be made by the firm both during day and night.
		(k) The work will be carried out on the route approved by this organization.

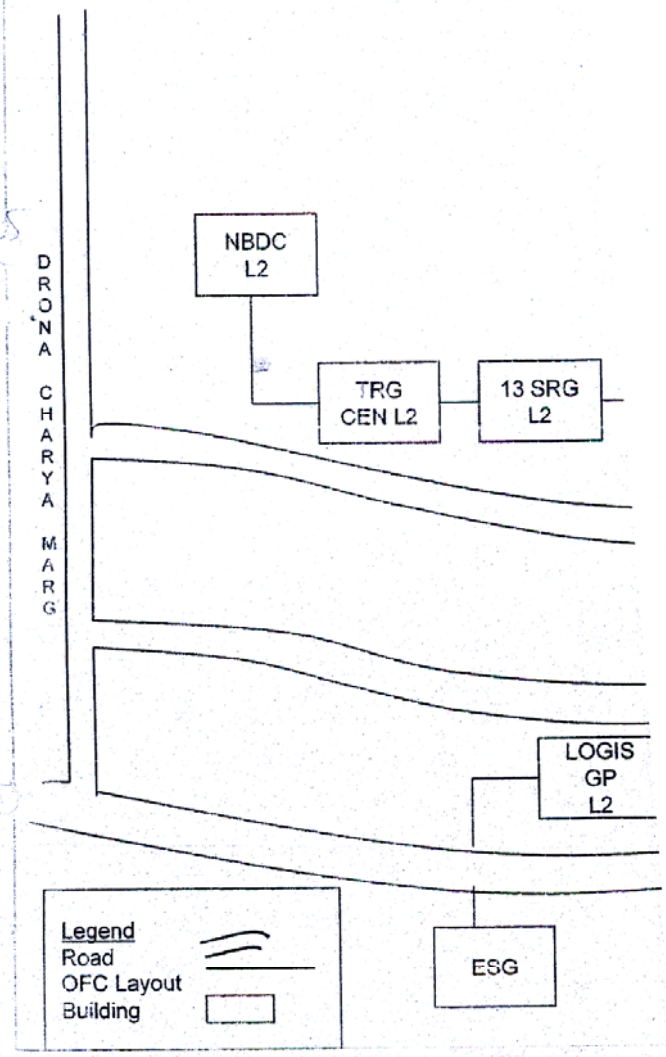
Sl No	Parameter	Specification
		(l) Bricks will be placed on cables for purpose of a warning to people digging.
		(m) The route indicators and the joint indicators will be placed at every 200 mtrs and at every joint and change in direction. Hand hole will be made at every 200 metre.
		(n) The splicing will be done and protected as per DOT standard.
6	Operation And Maintenance. The vendor will supply the detailed drawing of laid OFC.	
	DETAILED EQUIPMENT FOR LAYING OF 24 CORE OPTICAL FIBRE CABLE	
		Items of work Qty
		Excavation of trenches and reinstatement after completion, including excavation of surface and clearance of any obstacles enroute such as road, in all types of soil ordinary/hard, concrete, road crossing, set stones, bricks, foot paths city/built up/non built up area enroute on this route.

Sl No	Parameter	Specification
		Laying and jointing of 50mm dia HDPE pipes in the excavated trenches before their reinstatement, pulling through 4mm Nylone rope security sealing ends upto 100 mtrs. Securing ends of the pipes by suitable covers.
		Supply, laying and jointing of 80mm dia GI Pipes
		Supply, laying and jointing of 100mm dia RCC pipes
		Constructions of brick chambers 1.6 mtr with RCC covers
		Supply and fixing of route indicators made of cone at every 200m
		Digging of pits at the pulling points cleaning HDPE pipe, pulling of Nylon rope & OFC cable.
		Jointing of OFC cable excluding, jointing material complete by machine jointing by fusion method.
		Man Hole on every 2 Km
		Hand Hole on every 200m
		Earthing

DETAILED EQUIPMENT FOR LAYING OF 24 CORE OPTICAL FIBRE CABLE

Ser No	Items of work	Qty
1.	Excavation of trenches and reinstatement after completion, including excavation of surface and clearance of any obstacles enroute such as road, in all types of soil ordinary/hard, concrete, road crossing, set stones, bricks, foot paths city/built up/non built up area enroute on this route.	
2.	Laying and jointing of 32mm dia HDPE pipes in the excavated trenches before their reinstatement, pulling through 4mm Nylone rope security sealing ends upto 100 mtrs. Securing ends of the pipes by suitable covers.	
3.	Supply, laying and jointing of 50mm dia GI Pipes will be used for road crossings.	
4.	Supply and fixing of route indicators made of cone at every 200m	
5.	Digging of pits at the pulling points cleaning HDPE pipe, pulling of Nylon rope & OFC cable.	
6.	Jointing of OFC cable excluding, jointing material complete by machine jointing by fusion method.	
7.	Man Hole on every 2 Km	

CAMPUS I



(iv) Line Impedance	75. For BNC
(v) Framing	ITU G.704 Double/Multiple (Selectable)
(vi) Connector	RJ48C, BNC, DB37

Sl No	Parameter	Specification
4	**Ethernet Interface**	
	(I) Data Rate -	(I) 10/100 Mbps auto sense or by dip switch setting manually
	(ii) Connector -	(ii) RJ-45 socket
	(iii) Standard -	(iii) IEEE802.3/IEEE802.3u compliance
5	**Power Supply**	
	(I) Support power supply lotulbs	(a) Single fixed AC power supply. (b) Hot swappable duel AC or DC power supply.
6	**Indicators**	
		(I) Local and remote performance Indicators (ii) Local and remote loop backs for optical link and each E1 link
7	**Diagnostics Test**	
	(I) Optical Fiber	Local and remote loop backs
	(ii) E1 Lines	Local and remote loop backs
8	**Management**	
		Management through console port, Ethernet port and SNMP agents.
		(ii) Office alarm contacts
9	**Switches and Contacts**	
		Power , Alarm cut-off, reset, A & B dip switches for command setup and ENTER for command execute.
		Major and minor alarm contact closures, DB9F connector.

85

Sl No	Parameter	Specification
10	**Physical/Electrical**	
	(a) Dimensions for 1U	44into 432 into 255mm
	(b) Dimensions for 2U	88 into 432 into 255 mm
	(c) Mounting	Stand-alone, 19 or 23 inch rack mount
	(d) Power Source	-42 to -60 Vdc or 100 to 240 Vac,50/60 Hz
	(e) Power Protection :	Optional 1 + 1 APS
	(f) Power Consumption	< 30 W
	(g) Temperature Range	0<C to 50 <C
	(h) Humidity	0% - 95% RH (non-condensing)

Appendix 'H'

(refers to Page 2 Ser 2 (h))

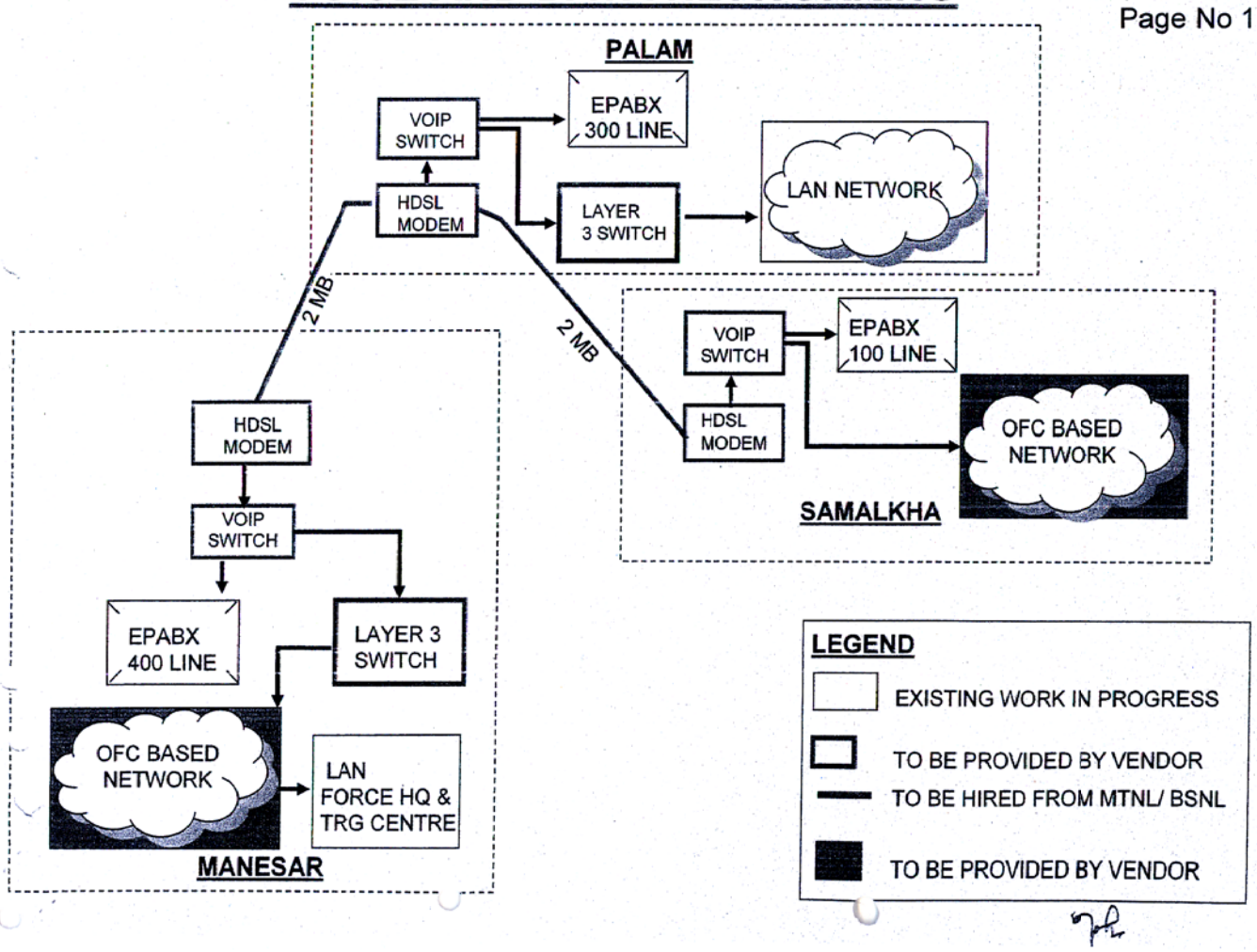
QR FOR SUPPLY OF UPS 1 KVA ON LINE FOR DIFFERENT SUB SYSTEMS OF DATA NETWORK

Sl No	Parameter	Technical Specification.
1	Input	160V - 260V 50 Hz + 05%, single phase
2	Output	220V + 1% 50 Hz + 1%
3	Rating	1KVA
4	Power Factor	0.7 - 0.8 lagging to unity
5	Inverter Efficiency	> 86%
6	Wave Form	Pure Sine wave
7	Transfer Response	+ 4% for 100% instantaneous load variation
8	Protection	a) Overload/short circuit protection at the output of UPS
		b) Prevent overheating and transfer the load to bypass line
9	Noise level	< 55 Db at one meter distance
10	Backup time	a) Minimum 10 - 15 mins with internal batteries
		b) Upto 4 - 8 hours backup with external batteries
11	Visual Indication	AC mains, AC main higher/low, inverter on mains, inverter on batteries, fault, and overload, load on bypass, load level/battery level bar graph.
12	Metering	input voltage/output voltage/ output current/output frequency/ DC voltage

Sl No	Parameter	Technical Specification.
13	Certification	(a) Safety standard certification as per IEC 950/ EN50091-1
		(b) EMC/EMI certification as per IEC 950/En50091-2.
14	Environmental Condition.	Environmental Condition.
	(a) Temperature	
	(i) Operating	0° to 45°C
	(ii) Storage	-25 to +70°C
	(b) Relative Humidity	
	(i) Operating	10 to 85%(non condensing)
	(ii) Storage	10 to 85%(non condensing)

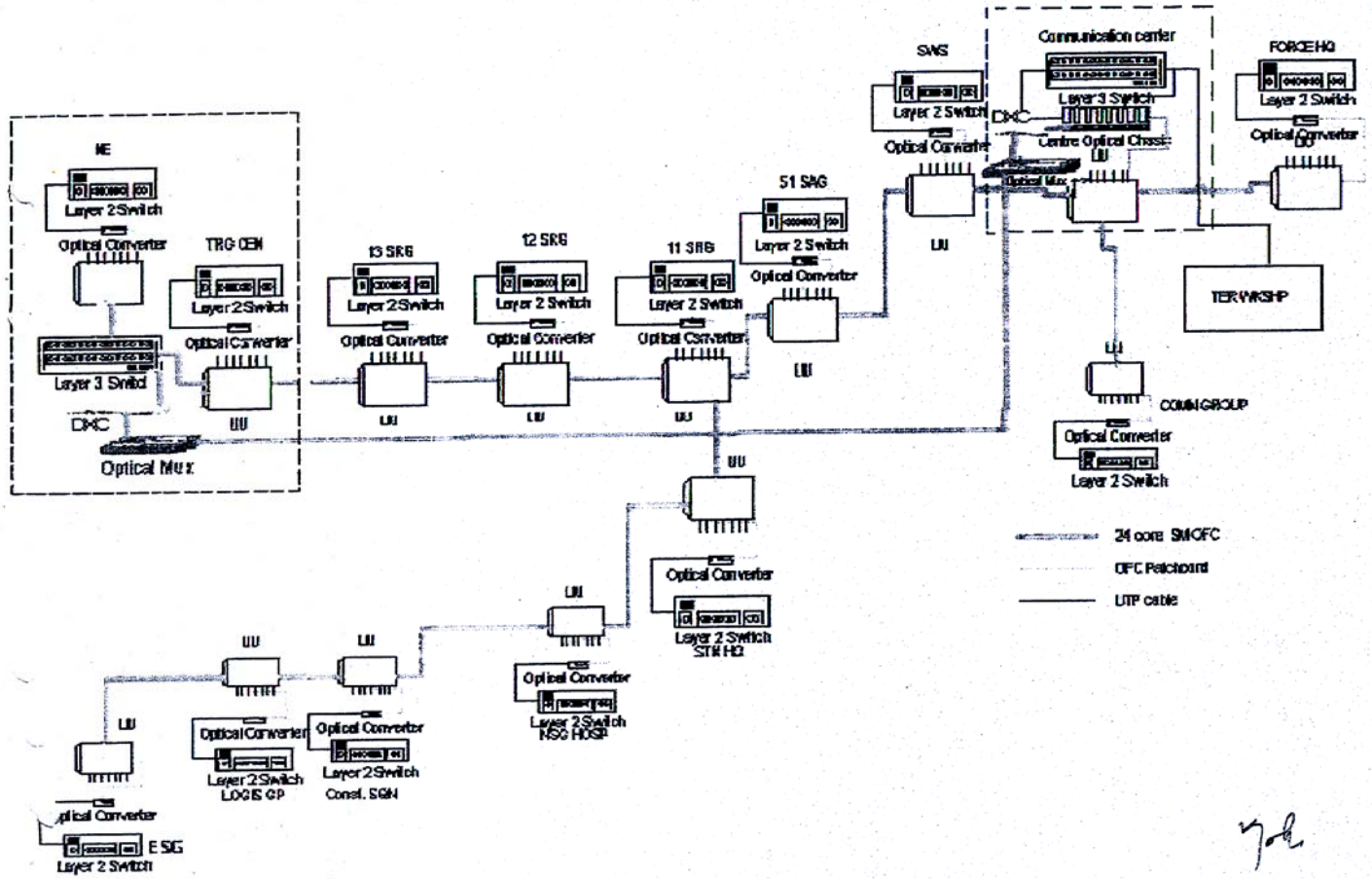
Appendix 'J'
(Refers to para 1 of Page No 1)

VOICE AND DATA NETWORKING



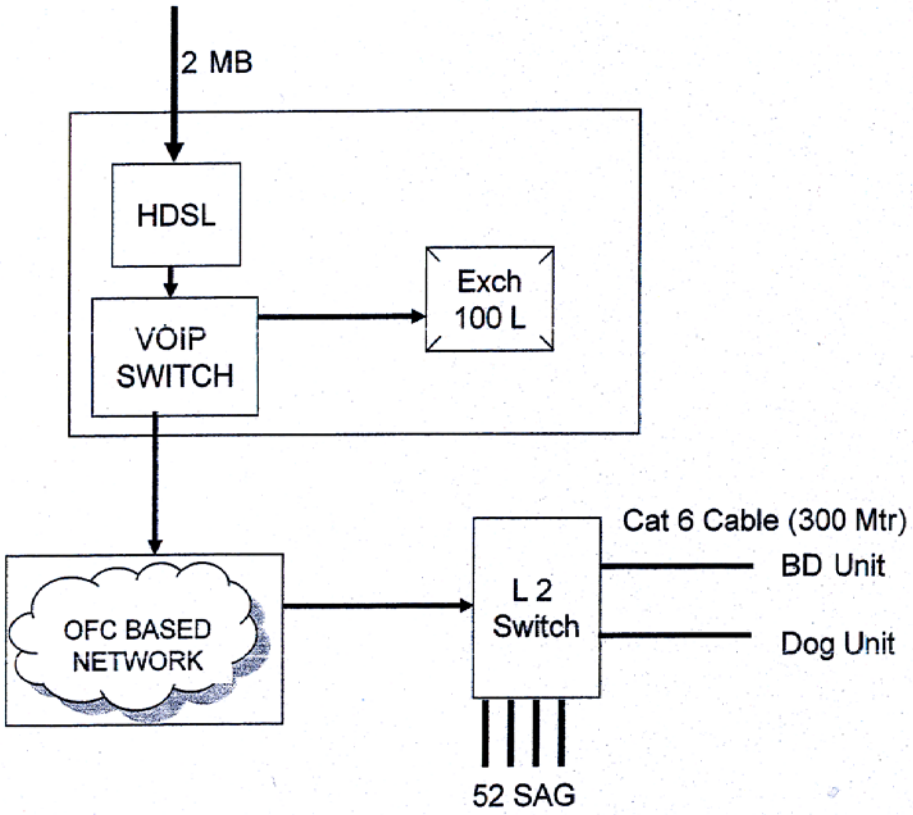
Annexure I of Appx 'J'

OFC CAMPUS NETWORK AT MANESAR



ANNEXURE II OF APPX 'J'

OFC LAYOUT AT SAMALKHA



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