GOVERNMENT OF INDIA
(Ministry of Home Affairs)
DIRECTORATE GENERAL
CENTRAL RESERVE POLICE FORCE
EAST BLOCK-7, SEC-1, R.K. PURAM, NEW DELHI-110066
(Tele/Fax No-011-26107493, Email-Id: comncell@crpf.gov.in**)**

No. B.V-7/2022-23-C (OFC) Dated, the 27 June'2022

To

DIG (C-Eqpt), BSF
Block No.10
CGO Complex
New Delhi-110003

Subject: **Regarding QRs/TDs "Voice and Data Network over OFC with futuristic plan for integration of surveillance equipments".**

Please find enclosed QRs/TDs of "Voice and Data Network over OFC with futuristic plan for integration of surveillance equipments" as Annexure-"A" duly approved by the competent authority is forwarded herewith for further necessary action.

Encl:- (QRs/TDs of subject item)

27/6/22

{Amit Taneja}
DIG (Equipment)
Directorate General, CRPF

Copy to:-

1. DIG (Comn) NSG, Mehram Nagar Palam, New Delhi-37
2. DIG (Comn) SSB, East Block-V, R.K. Puram, New Delhi-66
3. DIG (Comn) ITBP, Block No.2, CGO Complex Lodhi Road New Delhi-03
4. AIG (Comn) CISF, Block No.13, CGO Complex, Lodhi Road New Delhi-03
5. Liaison Office Assam Riffle Room No.171, North Block, MHA New Delhi-01

{Amit Taneja}
DIG (Equipment)
Directorate General, CRPF

QUALITATIVE REQUIREMENTS AND TRIAL DIRECTIVES OF IMPLEMENTATION OF A TURNKEY PROJECT FOR PROVIDING VOICE & DATA NETWORK OVER OFC WITH FUTURISTIC PLAN FOR INTEGRATION OF SURVEILLANCE EQUIPMENTS

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
1. Joystick				
1.1	Interface	**RS** 485 (terminal black), Ethernet (RJ45)	The FAT report needs to be submitted & the functionality needs to be verified by the BOO	The interface must be as per requirement mentioned in the QRs.
1.2	Baud rate	300 bps ~ 115,200bps	The FAT report needs to be submitted & the functionality needs to be verified by the BOO	The Baud rate must be as per requirement mentioned in the QRs.
1.3	Supports Protocols	Over 70 sorts of PTZ protocol (IDIS, PANASONIC, PELCO, SAMSUNG etc)	The FAT report needs to be submitted & the functionality needs to be verified by the BOO	The supports protocols must be as per requirement mentioned in the QRs.
1.4	Support device	IP camera, NVR	The FAT report needs to be submitted & the functionality needs to be verified by the BOO	The support device must be as per requirement mentioned in the QRs.
1.5	Display	LCD (2 LINE)	The FAT report needs to be submitted & the functionality needs to be verified by the BOO	The display must be as per requirement mentioned in the QRs.
1.6	USB	Min 1 port	The FAT report needs to be submitted & the functionality needs to be verified by the BOO	The USB must be as per requirement mentioned in the QRs.
1.7	Audio in/out (Min)	1(3.5mm)/1(3.5mm	The FAT report needs to be submitted & the functionality needs to be verified by the BOO	The Audio in/out (Min) must be as per requirement mentioned in the QRs.
1.8	Component	Joystick main control board	The FAT report needs to be submitted & the functionality needs to be verified by the BOO	The component must be as per requirement mentioned in the QRs.
General:- i) Remote control of NVRs, DVRs, network video transmitters, network video receivers and network cameras via network connection. ii) Control of NVRs by using a USB mouse via network connection. iii) Two-way audio communication. iv) Convenient firm are upgrades via either the USB port or Ethernet. v) Firm are duplication and auto-recovery functions to enhance system. vi) Stability vii) Management of Multiple network keyboards via network connection. viii) Programmable by using the LCD screen.			To be checked physically by BOO.	All additional items must be as per requirement mentioned in the QRs.
2. 3C X 2.5 SQ MM IS 1554 Standard Part-I or latest cable				

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
2.1	Conductor Dia	2.5 square mm	To be checked physically by BOO	The Conductor Dia must be as per requirement mentioned in the QRs.
2.2	Armour	Insulated bare copper, GI Wire armouring inner and outer PVC Sheathed IS 1554 standard part-I or latest.	To be checked physically by BOO	Armour must be Insulated bare copper, GI Wire armouring inner and outer PVC Sheathed IS 1554 standard part-I or latest
2.3	No. of Cores	3	To be checked physically by BOO	Cores must be 3.
2.4	Voltage Level	1.1KV	Firm has to submit the OEM certificate.	Voltage level must be as per requirement mentioned in the QRs.
3. SFP Module 10G for OLT and Core Switch				
3.1	SFP MSA package with duplex LC connector.	To be physically checked by the BOO.		The SFP MSA package with duplex LC connector must be as per the requirement mentioned in the QRs.
3.2	Very low EMI and excellent ESD protection.	To be physically checked by the BOO.		The specifications must be as per the requirement mentioned in the QRs.
3.3	Digital Diagnostic Monitor Interface.	To be physically checked by the BOO.		System must have Digital Diagnostic Monitor Interface.
3.4	Hot pluggable.	To be physically checked by the BOO.		System must be Hot pluggable.
3.5	10Gb/s serial optical interface.	To be physically checked by the BOO.		System must have 10GB/s serial optical interface.
3.6	Up to 10km distance.	To be physically checked by the BOO.		System must be upto 10km distance.
3.7	Compliant with SFP+ MSA.	To be physically checked by the BOO.		System must be compliant with SFP+MSA.
3.8	High transmission margin.	To be physically checked by the BOO.		System must have High transmission margin.
3.9	+3.3V single power supply.	To be physically checked by the BOO.		System must have +3.3V single power supply
3.10	Below <1.5W power consumption	To be physically checked by the BOO.		System must have Below <1.5W power consumption.
3.11	SFP mechanical	To be physically checked by the BOO.		System must have SFP mechanical interface.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	interface.			
3.12	10G BASE-BX at 10.3125 Gb/s.	To be physically checked by the BOO.		System must have 10GBASE-BX at 10.3125 Gb/s.
3.13	10GBASE-BX at 9.953 Gb/s.	To be physically checked by the BOO.		System must have 10GBASE-BX at 9.953 Gb/s.
4.. 2:4 Optical Power Splitters				
4.1	Operating wavelength	PLC: 1260~1650	Specification to be verified by the BOO through specification sheet	Operating wavelength must be as per the requirement mentioned in the QRs.
4.2	Maximum Insertion Loss	**≤7 dB**	Specification to be verified by the BOO through specification sheet	Maximum insertion loss must be as per the requirement mentioned in the QRs.
4.3	Uniformity	<1 dB	Specification to be verified by the BOO through specification sheet	Uniformity must be as per the requirement mentioned in the QRs.
4.4	Maximum Polarization Dependent Loss (PDL)	0.2 dB (Maximum)	Specification to be verified by the BOO through specification sheet	Maximum PDL must be as per the requirement mentioned in the QRs.
4.5	Directivity	>55 dB	Specification to be verified by the BOO through specification sheet	Directivity must be as per the requirement mentioned in the QRs.
4.6	Return Loss	>55 dB	Specification to be verified by the BOO through specification sheet	Return loss must be as per the requirement mentioned in the QRs.
4.7	Operating Temperature	-40~+85^{0}C	Specification to be verified by the BOO through specification sheet	Operating temperature must be as per the requirement mentioned in the QRs.
4.8	Storage Temperature	-40~+85^{0}C	Specification to be verified by the BOO through specification sheet	Storage temperature must be as per the requirement mentioned in the QRs.
4.9	Operating relative humidity	5~95%UR	Specification to be verified by the BOO through specification sheet	Operative relative humidity must be as per the requirement mentioned in the QRs.
4.10	Storage relative humidity	5~95%UR	Specification to be verified by the BOO through specification sheet	Storage relative humidity must be as per the requirement mentioned in the QRs.
Dimensional features for splitter with connector				
4.11	Length (P)	55 +/- 5mm	Specification to be verified by the BOO through specification sheet	Length (P) must be as per the requirement mentioned in the QRs.
4.12	High (A)	4mm (maximum)	Specification to be verified by the BOO through specification	High (A) must be as per the requirement

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
			sheet	mentioned in the QRs.
4.13	Input Pigtail Length	1m (maximum)	Specification to be verified by the BOO through specification sheet	Input Pigtail Length must be as per the requirement mentioned in the QRs.
4.14	Output Pigtail Length	1m (maximum)	Specification to be verified by the BOO through specification sheet	Output Pigtail Length must be as per the requirement mentioned in the QRs.
4.15	Pigtail Diameter	900µm	Specification to be verified by the BOO through specification sheet	Pigtail Diameter must be as per the requirement mentioned in the QRs.
4.16	PLC splitter should have housed in CRCA powder coated rugged metallic enclosure	Yes	Specification to be verified by the BOO through specification sheet	PLC splitter must be housed in CRCA powder coated rugged metallic enclosure
4.17	PLC splitter should be able to work under harsh weather condition	Yes	Specification to be verified by the BOO through specification sheet	PLC splitter must be able to work under harsh weather condition
5.. 2:8 Optical Power Splitter				
5.1	Operating wavelength	PLC: 1260~1650 nm	Specification to be verified by the BOO through specification sheet	Operating wavelength must be as per the specifications mentioned in the QRs.
5.2	Maximum Insertion Loss	11.0 dB	Specification to be verified by the BOO through specification sheet	Maximum Insertion loss must be as per the specifications mentioned in the QRs.
5.3	Uniformity	<1.60 dB	Specification to be verified by the BOO through specification sheet	Uniformity must be as per the specifications mentioned in the QRs.
5.4	Maximum Polarization Dependent Loss (PDL)	0.25 dB (maximum)	Specification to be verified by the BOO through specification sheet	Maximum PDL must be as per the specifications mentioned in the QRs.
5.5	Directivity	>55 dB	Specification to be verified by the BOO through specification sheet	Directivity must be as per the specifications mentioned in the QRs.
5.6	Return Loss	>55 dB	Specification to be verified by the BOO through specification sheet	Return Loss must be as per the specifications mentioned in the QRs.
5.7	Operating Temperature	-40~+85^{0}C	Specification to be verified by the BOO through specification sheet	Operating temperature must be as per the specifications mentioned in the QRs.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
5.8	Storage Temperature	-40~+85^{0}C	Specification to be verified by the BOO through specification sheet	Storage temperature must be as per the specifications mentioned in the QRs.
5.9	Operating relative humidity	5~95%UR	Specification to be verified by the BOO through specification sheet	Operating relative humidity must be as per the specifications mentioned in the QRs.
5.10	Storage relative humidity	5~95%UR	Specification to be verified by the BOO through specification sheet	Storage relative humidity must be as per the specifications mentioned in the QRs.
5.11	Operating wavelength	FBT: 1260~1650 nm	Specification to be verified by the BOO through specification sheet	Operating wavelength must be as per the specifications mentioned in the QRs.
5.12	Storage relative humidity	5~95%UR	Specification to be verified by the BOO through specification sheet	Storage relative humidity must be as per the specifications mentioned in the QRs.
Dimensional features for splitter with connector				
5.13	Length (P)	55 +/- 5mm	Specification to be verified by the BOO through specification sheet	Length (P) must be as per the specifications mentioned in the QRs.
5.14	Width (L)	7mm (maximum)	Specification to be verified by the BOO through specification sheet	Width (A) must be as per the specifications mentioned in the QRs.
5.15	Height (A)	4mm (maximum)	Specification to be verified by the BOO through specification sheet	Height (A) must be as per the specifications mentioned in the QRs.
5.16	Input Pigtail Length	1m (maximum)	Specification to be verified by the BOO through specification sheet	Input Pigtail Length must be as per the specifications mentioned in the QRs.
5.17	Output Pigtail Length	1m (maximum)	Specification to be verified by the BOO through specification sheet	Output Pigtail Length must be as per the specifications mentioned in the QRs.
5.18	Pigtail Diameter	900µm	Specification to be verified by the BOO through specification sheet	Pigtail diameter must be as per the specifications mentioned in the QRs.
5.19	PLC splitter should have housed in CRCA powder coated rugged metallic enclosure	Yes	Specification to be verified by the BOO through specification sheet	PLC splitter must have housed in CRCA powder coated rugged metallic enclosure
5.20	PLC splitter should be	Yes	Specification to be verified by the BOO through specification	PLC splitter must be able to work under harsh

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	able to work under harsh weather condition		sheet	weather condition
6. . 12 Core Single Mode Optical Fiber Cable				
(A) Optical Fibre Sensor Cable:				
6.1	Loose Tube jelly filled Multi tube design	Loose Tube jelly filled **Uni-tube** design	Specification to be verified by the BOO through specification sheet	Loose Tube jelly must be as per the requirement mentioned in the QRs.
6.2	Single Mode	(ITU-T Rec. G652D) Fibre	Firm has submitted the OEM certificate	Single mode must be as per the requirement mentioned in the QRs.
6.3	Attenuation	At 1310nm ≤ 0.38 dB/Km	Firm has submitted the OEM certificate	Attenuation must be as per the requirement mentioned in the QRs.
6.4	Attenuation	At 1550 nm ≤0.25 dB/Km	Firm has submitted the OEM certificate	Attenuation must be as per the requirement mentioned in the QRs.
6.5	Core Diameter	9/125/250µ m	Firm has submitted the OEM certificate	Core Diameter must be as per the requirement mentioned in the QRs.
6.6	Clad Diameter	125 ± 1.0 µ m	Firm has submitted the OEM certificate	Clad diameter must be as per the requirement mentioned in the QRs.
6.7	Clad non circularity	≤1.0%	Firm has submitted the OEM certificate	Clad non circularity must be as per the requirement mentioned in the QRs.
6.8	Coating Diameter	245 ± 10 µ m	Firm has submitted the OEM certificate	Coating Diameter must be as per the requirement mentioned in the QRs.
6.9	Chromatic Dispersion	At 1550 nm ≤ 18.0 ps/nm.km	Firm has submitted the OEM certificate	Chromatic Dispersion must be as per the requirement mentioned in the QRs.
6.10	Zero Dispersion wave length	1300 ~1324 nm	Firm has submitted the OEM certificate	Zero Dispersion wave length must be as per the requirement mentioned in the QRs.
6.11	Zero Dispersion slop	≤ 0.092 ps/nm2.km	Firm has submitted the OEM certificate	Zero Dispersion slop must be as per the requirement mentioned in the QRs.
6.12	Cut-off Wavelength	i) Fiber cut off wavelength: ≤1320nm. ii) Cable cut off wavelength: ≤1260nm.	Specification to be verified by the BOO through specification sheet	Cut-off wavelength must be as per the requirement mentioned in the QRs.
6.13	Polarization Mode Diameter	≤0.2 ps/root km	Firm has submitted the OEM certificate	Polarization Mode Diameter must be as per the requirement

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				mentioned in the QRs.
6.14	Mode Field Diameter	At 1310 nm 9.2 ± 0.4 μ m	Firm has submitted the OEM certificate	Mode Field Diameter must be as per the requirement mentioned in the QRs.
6.15	Fibre Identification	Blue, Orange, Green, Brown, Slate, White, Red, Black, Yellow, Violet, Pink & Natural.	Specification to be verified by the BOO through specification sheet	Fibre Identification must be as per the requirement mentioned in the QRs.
6.16	No. of fibres	12 F	Firm has submitted the OEM certificate	Fibres must be 12 F as per the requirement mentioned in the QRs.
6.17	Moisture Barrier	Single layer of water **swellable** tape / Polyester Tape applied longitudinally	Firm has submitted the OEM certificate	Moisture Barrier must be as per the requirement mentioned in the QRs.
(B) Strength:				
6.18	Type (Outer Jacket)	2# Steel wire /FRP RODs	Firm has submitted the OEM certificate	Type (Outer Jacket) must be as per the requirement mentioned in the QRs.
6.19	Type (Peripheral)	Aramid Yarn/Glass Yarn	Firm has submitted the OEM certificate	Type (Peripheral) must be as per the requirement mentioned in the QRs.
(C) Mechanical and Environmental:				
6.20	Max Tensile Strength	3500 Newton	Firm has submitted the OEM certificate	Max Tensile Strength must be as per the requirement mentioned in the QRs.
6.21	Crush Resistance	Newton 4000/10 cm	Firm has submitted the OEM certificate	Crush Resistance must be as per the requirement mentioned in the QRs.
6.22	Minimum Bending radius	20 x Diameter	Firm has submitted the OEM certificate	Minimum Bending radius must be as per the requirement mentioned in the QRs.
6.23	Operating Temperature	-30°C to +70°C	Firm has submitted the OEM certificate	Operating Temperature must be as per the requirement mentioned in the QRs.
7. 24 Port Fiber LIU Fully Loaded With Single_Mode Sc Adopter, Adaptor Plate and Pigtail				
7.1	24 Ports Adapter with 4 adapter plates of 6 fibre each		To be checked physically by BOO	24 Ports adaptor must be as per the requirement mentioned in the QRs.
7.2	Consist of Top Cover and Bottom Panel		To be checked physically by BOO	Top Cover and Bottom Panel must be as per the requirement mentioned in the QRs.
7.3	Easy to Assemble and Dissemble		To be checked physically by BOO	Assemble and Dissemble must be as per the

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				requirement mentioned in the QRs.
7.4	Four cable entry ports		To be checked physically by BOO	Entry ports must be as per the requirement mentioned in the QRs.
7.5	Cable Entry Through Water Proof Cable Clamp		To be checked physically by BOO	Cable entry must be as per the requirement mentioned in the QRs.
7.6	Splice Max 12 Fibres at Most with 1 Tray		To be checked physically by BOO	Splice max must be as per the requirement mentioned in the QRs.
7.7	Patch Cord with Bend Radius Guides Minimize Macro Bending		To be checked physically by BOO	Patch cord must be as per the requirement mentioned in the QRs.
7.8	Install 2 Cable Management Rings/Cable Routing guide Inside to Ensure Flexibility		To be checked physically by BOO	Install 2 cable management must be as per the requirement mentioned in the QRs.
7.9	Comprehensive Accessory Kits for Cable Entry and Fibre Management		To be checked physically by BOO	Comprehensive Accessory kits must be as per the requirement mentioned in the QRs.
7.10	Body Material : Powder Coated CRCA		To be checked physically by BOO	Body material must be power coated CRCA.
7.11	**Miscellaneous** **ADAPTOR (SC)** SC/ adaptors should be Simplex type. Telcordia GR-326-Core. RoHS Compliance Low Insertion Adapters should have compact design & high precision Telcordia, TIA/EIA, IEC compliance <= 0.20 db for Zirconia Sleeve Durability (1000 Matings): <= 0.2db Main Body Material: Glass filled PBT SC		To be checked physically by BOO	As per the requirement mentioned in the QRs.
8. . SC-LC Fiber Duplex Patch Cord				
8.1	Range of Mode	Single Mode	Specification to be verified by the BOO through specification sheet	Range of mode must be as per the requirement mentioned in the QRs.
8.2	Cable Type	Duplex	Specification to be verified by the BOO through specification sheet	Cable type must be as per the requirement mentioned in the QRs.
8.3	Zip cord Connector Style	SC-LC	To be checked physically by BOO	Zip cord connector steeple must be as per the requirement mentioned in the QRs.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
8.4	Interface Type	PC, UPC, APC Cable	Specification to be verified by the BOO through specification sheet	Interface type must be as per the requirement mentioned in the QRs.
8.5	Diameter	0.9mm, 2.0mm, 3.0mm	To be checked physically by BOO	Diameter must be as per the requirement mentioned in the QRs.
8.6	Lengths	Standard & Custom Lengths Strength	Specification to be verified by the BOO through specification sheet	Lengths must be as per the requirement mentioned in the QRs.
8.7	Member	Aramid Yarn	Specification to be verified by the BOO through specification sheet	Member must be as per the requirement mentioned in the QRs.
8.8	Outer Jacket	PVC or LSZH	Specification to be verified by the BOO through specification sheet	Outer Jacket must be as per the requirement mentioned in the QRs.
8.9	Cable Assembly Length	15 meter Tolerance (+/- 10%)	Specification to be verified by the BOO through specification sheet	Cable Assembly length must be as per the requirement mentioned in the QRs.
8.10	**Durability**	500 cycles(0.2 dB max increase),	Specification to be verified by the BOO through specification sheet	Durability must be as per the requirement mentioned in the QRs
8.11	Operating Temp	-20 °C to +70°C	Specification to be verified by the BOO through specification sheet	Operating temp must be as per the requirement mentioned in the QRs.
8.12	Storage Temp	-20 °C to +75°C	Specification to be verified by the BOO through specification sheet	Storage temp must be as per the requirement mentioned in the QRs.
8.13	Ferrule Concentricity	< 1µm	Specification to be verified by the BOO through specification sheet	Ferrule concentricity must be as per the requirement mentioned in the QRs.
9.. LC-LC Fiber Duplex Patch Cord				
Single mode fibre optic patch cables send one light signal at a time and can be used for longer runs than multimode because they have more resistance to attenuation. The core of the single mode fibre optic cable is 9/125**µ** (micron). Single mode LC-LC fibre optic patch cables can support gigabit Ethernet applications for up to 10 kilometres				
9.1	Length	3m (maximum)	To be checked physically by BOO	Length must be as per the requirement mentioned in the QRs.
9.2	Connectors	LC-LC	To be checked physically by BOO	Connectors must be as per the requirement mentioned in the QRs.
9.3	Maximum connector loss	0.30dB	Specification to be verified by the BOO through specification sheet	Maximum connector lossmust be as per the requirement mentioned in the QRs.
9.4	Typical connector loss	0.30dB (maximum)	Specification to be verified by the BOO through specification sheet	Typical connector loss must be as per the requirement mentioned in

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				the QRs.
9.5	Typical return loss	-50 dB (maximum)	Specification to be verified by the BOO through specification sheet	Typical return loss must be as per the requirement mentioned in the QRs.
9.6	Buffer material	PVC	Specification to be verified by the BOO through specification sheet	Buffer material must be as per the requirement mentioned in the QRs.
9.7	Buffer OD	900 µm(+/- 50µm)	Specification to be verified by the BOO through specification sheet	Buffer OD must be as per the requirement mentioned in the QRs.
9.8	Jacket material	LSZH	Specification to be verified by the BOO through specification sheet	Jacket material must be as per the requirement mentioned in the QRs.
9.9	Operating temperature	-20°C to +70°C	Specification to be verified by the BOO through specification sheet	Operating temperature must be as per the requirement mentioned in the QRs.
10.. SC-SC Fiber Duplex Patch Cord				
10.1	Cable Diameter	3.0mm duplex	To be checked physically by BOO	Cable Diameter must be as per the specifications mentioned in the QRs.
10.2	Cable Type	Single Mode	To be checked physically by BOO	Cable type must be as per the specification mentioned in the QRs.
10.3	Reflection	Low back reflection and insertion loss	Specification to be verified by the BOO through specification sheet	Reflection must be as per the specification mentioned in the QRs.
10.4	Quality	Premium quality UPC ceramic ferrule for best performance	Specification to be verified by the BOO through specification sheet	Quality must be as per the specification mentioned in the QRs.
10.5	Cable Material	PVC	Specification to be verified by the BOO through specification sheet	Cable material must be as per the specification mentioned in the QRs.
10.6	Fiber Type	Single mode 9/125	Specification to be verified by the BOO through specification sheet	Fiber type must be as per the specification mentioned in the QRs.
10.7	Insertion Loss (Typical)	0.15 dB	Specification to be verified by the BOO through specification sheet	Insertion Loss (typical) must be as per the specification mentioned in the QRs.
10.8	Insertion Loss (Maximum)	0.30 dB	Specification to be verified by the BOO through specification sheet	Insertion loss (max) must be as per the specification mentioned in the QRs.
10.9	Return Loss	<=-50 dB (UPC)	Specification to be verified by the BOO through specification sheet	Return loss must be as per the specification mentioned in the QRs.
10.10	Operational Temperature	-20*C to +70*C	Specification to be verified by the BOO through specification sheet	Operational temperature must be as per the specification mentioned in the QRs.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
10.11	Tested	100% Fully Tested	Firm has submitted the OEM certificate	Cord must be 10% fully tested.
10.12	Length-	1 mtr (maximum)	To be checked physically by BOO	Length must be as per the specification mentioned in the QRs.
10.13	Connectors	SC-SC	To be checked physically by BOO	Connectors must be as per the specification mentioned in the QRs.
11. . CAT-6 Patch Cord – 3 MTR				
11.1	Type	Unshielded Twisted Pair, Category 6,TIA/ EIA 568-C.2	To be checked physically by BOO	Type of cord must be as per the specification mentioned in the QRs.
11.2	Conductor	24-26 AWG stranded copper.	Firm has submitted the OEM certificate	Conductor must be as per the specification mentioned in the QRs.
11.3	Length	3 meter (Maximum)	To be checked physically by BOO	Length must be as per the specification mentioned in the QRs.
11.4	Plug Protection	Matching colored snag-less, boot to maintain bend radius	Specification to be verified by the BOO through specification sheet	Plug protection must be as per the specification mentioned in the QRs.
11.5	Warranty	5-years component warranty, and 5-years performance warranty	Firm has submitted the OEM certificate	Warranty must be as per the specification mentioned in the QRs.
11.6	Category	Category 6 Plug	To be checked physically by BOO	Category must be as per the specification mentioned in the QRs.
11.7	Housing	**Clear polycarbonate**	To be checked physically by BOO	Housing must be as per the specification mentioned in the QRs.
11.8	Terminals	Phosphor Bronze with gold plating , SO micron" gold over nickel	To be checked physically by BOO	Terminals must be as per the specification mentioned in the QRs.
12. . Layer 2 switch 24 Port Managed Switch with 4x10 G				
12.1	Performance Features	**The switch should support Following switching capacity/Forwarding rate 24 GE RJ45 port with 4 nos. of 10G SFP+ uplinks 56 GBPs/83 Mbps or better**	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO	The switch must support switch capacity/ Forwarding rate as per the requirement mentioned in the QRs.
		Switch should	Firm has submitted the OEM	Switch must have 2 GB

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		have 2 GB RAM and 4 GB Flash or better	certificate	RAM and 4 GB Flash.
		Shall have minimum 16K MAC Addresses and 1024 active VLANs.	The functionality needs to be verified by the board of officers through Data Sheet.	Shall must have minimum 16K MAC Addresses and 1024 active VLANs.
		Switch should have slot/ports(excludin g uplinks) for minimum 80 Gbps of stacking bandwidth with dedicated stacking ports and cables with minimum 8 switch in stack	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must have slot/ports(excluding uplinks) for minimum 80 Gbps of stacking bandwidth with dedicated stacking ports and cables with minimum 8 switch in stack
		Switch should be able to support 3000 IPV4 & 1500 IPV6 routing entries.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must be able to support 3000 IPV4 & 1500 IPV6 routing entries.
		Switch should support minimum 512 Switched Virtual interfaces/ routed VLAN interfaces.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must support minimum 512 Switched Virtual Interfaces.
		The switch should support Jumbo frames of 9198 bytes	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support Jumbo frames of 9198 bytes
12.2	General Features	Proposed switch should be enterprise grade switch with x86 based CPU architecture	The functionality needs to be verified by the board of officers through Data Sheet.	Proposed switch must be enterprise grade switch with x86 based CPU architecture
		Layer 2, Routed Access (RIP, EIGRP Stub, OSPF - 1000 routes), PBR, PIM Stub Multicast (1000 routes), PVLAN, VRRP, PBR, CDP, QoS, FHS, 802.1X, MACsec-128,	The functionality needs to be verified by the board of officers through Data Sheet.	System must have Layer 2, Routed Access (RIP, EIGRP Stub, OSPF - 1000 routes), PBR, PIM Stub Multicast (1000 routes), PVLAN, VRRP, PBR, CDP, QoS, FHS, 802.1X, MACsec-128, CoPP, SXP, IP SLA Responder

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		CoPP, SXP, IP SLA Responder		
		The proposed switch should be software defined networking capable and be able to at least integrate easily with the industry standard SDN controllers.	The functionality needs to be verified by the board of officers through Data Sheet.	The proposed switch must be software defined networking capable and be able to at least integrate easily with the SDN controller from the same OEM.
		The Switch stack should be based on Distributed forwarding Architecture, where in each stack member forwards its own information on network.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch stack must be based on Distributed forwarding Architecture, where in each stack member forwards its own information on network.
		Switch should have unique secure identity so that its authenticity and origin can be confirmed with OEM. Switch BIOS, software image should be cryptographically signed to ensure integrity and switch should not boot with modified software regardless of user's privilege level.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must have unique secure identity so that its authenticity and origin can be confirmed with OEM. Switch BIOS, software image should be cryptographically signed to ensure integrity and switch should not boot with modified software regardless of user's privilege level.
		Switch shall support application visibility and traffic monitoring with minimum 16 K net Flow/sflow/jflow entries.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must support application visibility and traffic monitoring with minimum 16 K netFlow/sflow/jflow entries.
		Switches should support both front and back beacon	The functionality needs to be verified by the board of officers through Data Sheet.	Switches must support both front and back beacon LEDs for easy

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		LEDs for easy identification of the switch being accessed.		identification of the switch being accessed.
		Switches should have hardware support to connect a Bluetooth dongle to your switch, enabling you to use this wireless interface as an IP management port interface.	The functionality needs to be verified by the board of officers through Data Sheet.	Switches must have hardware support to connect a Bluetooth dongle to your switch, enabling you to use this wireless interface as an IP management port interface.
12.3	High availability & Resiliency	Switch should support redundant field replicable platinum rated power supplies.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must support redundant field replicable platinum rated power supplies.
		Switch should support redundant fans.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must support redundant fans.
		Switch should support cross-stack ether channel.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must support cross-stack ether channel.
		Switch should support embedded event manager scripts/GUI dashboard for easy monitoring	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must support embedded event manager scripts
		After a reboot when power is restored to a switch, switch should start delivering power to endpoints without waiting for the operating system to fully load.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must start delivering power to endpoints without waiting for the operating system to fully load.
12.4	L2 Features	The switch should support Automatic Negotiation of Trunking Protocol, to help minimize the configuration & errors	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support Automatic Negotiation of Trunking Protocol, to help minimize the configuration & errors

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		The switch should support IEEE 802.1Q VLAN encapsulation	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support IEEE 802.1Q VLAN encapsulation
		The switch should support Spanning-tree Port Fast and Port Fast guard for fast convergence	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support Spanning-tree Port Fast and Port Fast guard for fast convergence
		The switch should support Uplink Fast & Backbone Fast technologies to help ensure quick failover recovery, enhancing overall network stability and reliability	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support Uplink Fast & Backbone Fast technologies to help ensure quick failover recovery, enhancing overall network stability and reliability
		The switch should support Spanning-tree root guard to prevent other edge switches becoming the root bridge.	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support Spanning-tree root guard to prevent other edge switches becoming the root bridge.
		The switch should support Voice VLAN to simplify IP telephony installations by keeping voice traffic on a separate VLAN	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support Voice VLAN to simplify IP telephony installations by keeping voice traffic on a separate VLAN
		The switch should support Auto-negotiation on all ports to automatically selects half- or full-duplex transmission mode to optimize bandwidth	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support Auto-negotiation on all ports to automatically selects half- or full-duplex transmission mode to optimize bandwidth
		The switch should support Automatic media-dependent interface crossover (MDIX) to automatically adjusts transmit	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support Automatic media-dependent interface crossover (MDIX) to automatically adjusts transmit and receive pairs if an incorrect cable type

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		and receive pairs if an incorrect cable type (crossover or straight through) is installed.		(crossover or straight through) is installed.
		The switch should support Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD to allow for unidirectional links caused by incorrect fibre-optic wiring or port faults to be detected and disabled on fibre-optic interfaces.	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD to allow for unidirectional links caused by incorrect fibre-optic wiring or port faults to be detected and disabled on fibre-optic interfaces
		The switch should support IGMP v1, v2 Snooping	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support IGMP v1, v2 Snooping.
		Switch should support IPv4 and IPv6The Switch should be able to discover (on both IPv4 & IPv6 Network) the neighbouring device giving the details about the platform, IP Address, Link connected through etc, thus helping in troubleshooting connectivity problems.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must support IPv4 and IPv6The Switch should be able to discover (on both IPv4 & IPv6 Network) the neighbouring device giving the details about the platform, IP Address, Link connected through etc, thus helping in troubleshooting connectivity problems.
12.5	Network security features	The switch should support IEEE 802.1x providing user authentication, authorization and CoA.	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support IEEE 802.1x providing user authentication, authorization and CoA.
		The switch should support SSHv2 and SNMPv3 to provide network	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support SSHv2 and SNMPv3 to provide network security by encrypting

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		security by encrypting administrator traffic during Telnet and SNMP sessions.		administrator traffic during Telnet and SNMP sessions.
		The switch should support TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration.	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration.
		The switch should support MAC address notification to allow administrators to be notified of users added to or removed from the network.	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support MAC address notification to allow administrators to be notified of users added to or removed from the network.
		The switch should support MACSec-128	The functionality needs to be verified by the board of officers through Data Sheet.	The switch must support MACSec-128
12.6	Quality of Service	Switch should support 802.1p Class of Service (CoS) and Differentiated Services Code Point (DSCP) field classification, Shaped Round Robin (SRR) scheduling, Committed Information Rate (CIR), and eight egress queues per port.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must support 802.1p Class of Service (CoS) and Differentiated Services Code Point (DSCP) field classification, Shaped Round Robin (SRR) scheduling, Committed Information Rate (CIR), and eight egress queues per port.
12.7	Layer-3 Features should be supported post a license upgrade from	The Switch should support routing protocols such OSPF, BSR, IS-ISv4, LISP, VXLAN, VRF.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support routing protocols such OSPF, BSR, IS-ISv4, LISP, VXLAN, VRF.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	L2 to L3			
		The Switch should support IPv6 Routing capable protocols such as OSPFv3 in hardware.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support IPv6 Routing capable protocols such as OSPFv3 in hardware.
		The Switch should support IP Multicast and PIM, PIM Sparse Mode, & Source-Specific Multicast for Wired and Wireless Clients.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support IP Multicast and PIM, PIM Sparse Mode, & Source-Specific Multicast for Wired and Wireless Clients.
		The Switch should support basic IP Unicast routing protocols (static, RIPv1 & RIPv2).	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support basic IP Unicast routing protocols (static, RIPv1 & RIPv2).
		The Switch should support IPv6 & IPv4 Policy Based Routing (PBR).	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support IPv6 & IPv4 Policy Based Routing (PBR).
		The Switch should support Inter-VLAN routing.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support Inter-VLAN routing.
		The Switch should support HSRP for IPv4 & IPv6.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support HSRP for IPv4 & IPv6.
		The Switch should support VRRPv3.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support VRRPv3.
		The Switch should support uRPF for IPv4 and IPv6.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support uRPF for IPv4 and IPv6.
12.8	Native support of following L3 features from day - 1	The Switch should support routing protocols such OSPF, BSR, IS-ISv4, LISP, VXLAN, VRF.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support routing protocols such OSPF, BSR, IS-ISv4, LISP, VXLAN, VRF.
		The Switch should support IPv6 Routing capable protocols such as OSPFv3 in hardware.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support IPv6 Routing capable protocols such as OSPFv3 in hardware.
		The Switch should support IP Multicast and PIM,	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support IP Multicast and PIM, PIM Sparse Mode, & Source-

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		PIM Sparse Mode, & Source-Specific Multicast for Wired and Wireless Clients.		Specific Multicast for Wired and Wireless Clients.
		The Switch should support basic IP Unicast routing protocols (static, RIPv1 & RIPv2).	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support basic IP Unicast routing protocols (static, RIPv1 & RIPv2).
		The Switch should support IPv6 & IPv4 Policy Based Routing (PBR)	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support IPv6 & IPv4 Policy Based Routing (PBR)
		The Switch should support Inter-VLAN routing.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch should support Inter-VLAN routing.
		The Switch should support HSRP for IPv4 & IPv6.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support HSRP for IPv4 & IPv6.
		The Switch should support VRRPv3.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support VRRPv3.
		The Switch should support uRPF for IPv4 and IPv6.	The functionality needs to be verified by the board of officers through Data Sheet.	The Switch must support uRPF for IPv4 and IPv6.
12.9	Certifications	Safety certifications - IEC 60950-1,UL 60950-1,CAN/CSA C22.2 No. 60950-1,EN 60950-1,AS/NZS 60950.1,Class I Equipment.	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must have Safety certifications - IEC 60950-1,UL 60950-1,CAN/CSA C22.2 No. 60950-1,EN 60950-1,AS/NZS 60950.1,Class I Equipment.
		Electromagnetic emissions certifications - 47 CFR Part 15,CISPR 22 Class A,CISPR 32 Class A,CNS 13438,EN 300 386*,EN 55022 Class A,EN 55032 Class A,EN61000-3-2,EN61000-3-3,ICES-003 Class A,KN 32,TCVN 7189 Class A,V-3 Class A,CISPR	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must have Electromagnetic emissions certifications - 47 CFR Part 15,CISPR 22 Class A,CISPR 32 Class A,CNS 13438,EN 300 386*,EN 55022 Class A,EN 55032 Class A,EN61000-3-2,EN61000-3-3,ICES-003 Class A,KN 32,TCVN 7189 Class A,V-3 Class A,CISPR 24,EN 300 386*,EN 55024,KN 35,TCVN 7317.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		24,EN 300 386*,EN 55024,KN 35,TCVN 7317		
		Environmental - Reduction of Hazardous Substances (ROHS) 5	The functionality needs to be verified by the board of officers through Data Sheet.	Switch must have Reduction of Hazardous Substances (ROHS) 5.
12.10	Operating Temperature Range	Normal operating temperature and altitudes:	The functionality needs to be verified by the board of officers through Data Sheet.	Temperature of the switch must be as per the requirement mentioned in the QRs.
		-5ºC to +45ºC, up to 5000 feet (1500m)	The functionality needs to be verified by the board of officers through Data Sheet.	
		-5ºC to +40ºC, up to 10,000 feet (3000m)	The functionality needs to be verified by the board of officers through Data Sheet.	
		Minimum ambient temperature for cold start is 32°F (0°C)	The functionality needs to be verified by the board of officers through Data Sheet.	
		-5ºC to +50ºC, up to 5000 feet (1500m)	The functionality needs to be verified by the board of officers through Data Sheet.	
		-5ºC to +45ºC, up to 10,000 feet (3000m)	The functionality needs to be verified by the board of officers through Data Sheet.	
		-5ºC to +45ºC, at sea level with single fan failure	The functionality needs to be verified by the board of officers through Data Sheet.	
13. . IP 66 Termination Box for ONU				
13.1	IP 66 Cabinet with mounting arrangement		To be checked physically by BOO	Termination box must have IP 66 Cabinet with mounting arrangement.
13.2	CRCA Powder coated rugged metallic enclosure		To be checked physically by BOO	Termination box must have CRCA Powder coated rugged metallic enclosure.
13.3	Size to be customised as per the requirement		To be checked physically by BOO	Termination box must have size to be customised as per the requirement.
13.4	Compact design with air circulation space		To be checked physically by BOO	Termination box must have compact design with air circulation space.
13.5	Inner tray for splice sleeve		To be checked physically by BOO	Termination box must have inner tray for splice sleeve.
13.6	Available with 2 Pcs SC Duplex number of adapters		To be checked physically by BOO	Termination box must have SC duplex as per the

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				requirement mentioned in the QRs.
13.7	Normal splice type		To be checked physically by BOO	Termination box must have normal splice type.
13.8	DIN Rail mounting arrangement		To be checked physically by BOO	Termination box must have DIN rail mounting arrangement.
13.9	08 Nos Cable entry points with PVC gland		To be checked physically by BOO	Termination box must have 08 Nos cable entry points with PVC gland.
13.10	02 MCBs 10/16 AMP for AC mains power connectivity and control		To be checked physically by BOO	Termination box must have 02 MCBs 10/16 AMP for AC mains power connectivity and control.
13.11	Power extension point with 03 Nos 5 AMP power socket with switch and sufficient power cable		To be checked physically by BOO	Termination box must have power extension point with 03 Nos 5 AMP power socket with switch and sufficient power cable
13.12	Provision for earthing connection		To be checked physically by BOO	Termination box must have provision for earthing connection.
14.Trial Directives 19 Inches 9U Network Rack				
14.1	Rack enclosure 9U wall mount		To be checked physically by BOO	Rack enclosure must be as per the requirement mentioned in the QRs
14.2	EIA standard 19" Rack rails		To be checked physically by BOO	EIA standard must be as per the requirement mentioned in the QRs
14.3	Width : 600 MM (+/- 10 mm)		To be checked physically by BOO	Width must be as per the requirement mentioned in the QRs
14.4	Depth : 550 MM (+/- 10 mm)		To be checked physically by BOO	Depth must be as per the requirement mentioned in the QRs
14.5	Transparent toughened glass front door with lock		To be checked physically by BOO	Transparent toughened must be as per the requirement mentioned in the QRs
14.6	Fan tray with 2 fans for heat dissipation		To be checked physically by BOO	Fan Try must be as per the requirement mentioned in the QRs
14.7	One No. Horizontal power distribution unit with 5 Point AC 6 & 16 AMP socket and MCB		To be checked physically by BOO	Horizontal power distribution must be as per the requirement mentioned in the QRs
14.8	Mounting hardwares (20 NOS)		To be checked physically by BOO	Mounting hardware must be as per the requirement mentioned in the QRs
14.9	Horizontal Manager		To be checked physically by BOO	Horizontal Manager must

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				be as per the requirement mentioned in the QRs
14.10	Support cable entry from top or bottom		To be checked physically by BOO	Support cable entry must be as per the requirement mentioned in the QRs
14.11	One Cantilever shelf		To be checked physically by BOO	Cantilever shelf must be as per the requirement mentioned in the QRs
15. . 19 Inches 42U Network Rack				
15.1	Rack enclosure 42U floor standing		To be checked physically by BOO	Rack enclosure must be as per the requirement mentioned in the QRs
15.2	EIA standard 19" rack rails		To be checked physically by BOO	EIA standard must be as per the requirement mentioned in the QRs.
15.3	Width : 800 MM (+/- 10mm)		To be checked physically by BOO	Width must be as per the requirement mentioned in the QRs.
15.4	Depth : 1000 MM (+/- 10mm)		To be checked physically by BOO	Depth must be as per the requirement mentioned in the QRs.
15.5	Transparent toughened glass front door with lock		To be checked physically by BOO	Transparent toughened glass must be as per the requirement mentioned in the QRs.
15.6	Side panels with key locks and slam latch		To be checked physically by BOO	Side panels must be as per the requirement mentioned in the QRs.
15.7	Rear door with lock		To be checked physically by BOO	Rear door must having lock.
15.8	Fan tray with 4 fans for heat dissipation		To be checked physically by BOO	Fan tray must be as per the requirement mentioned in the QRs.
15.9	Shelf for monitor display		To be checked physically by BOO	Rack must have shelf for monitor display.
15.10	Shelf with keyboard tray		To be checked physically by BOO	Rack must have shelf with keyboard tray.
15.11	Two Nos. vertical power distribution unit with 10 point AC 6 & 16 AMP socket and MCB		To be checked physically by BOO	Rack must have Two Nos. vertical power distribution unit with 10 point AC 6 & 16 AMP socket and MCB.
15.12	Earthing strip		To be checked physically by BOO	Rack must have earthing strip.
15.13	Mounting hardwares (50 NOS)		To be checked physically by BOO	Mounting hardware Two Nos. vertical power distribution unit with 10 point AC 6 & 16 AMP socket and MCB
15.14	Support cable for top or bottom		To be checked physically by BOO	Rack must have support cable for top or bottom.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
15.15	Heavy duty castor wheels & break		To be checked physically by BOO	Rack must have heavy duty castor wheels & break.
15.16	Vertical Manager		To be checked physically by BOO	
16. . SFP Module 1G Single Mode LC				
16.1	IEEE Standard	1000 Base LX	Firm has submitted the OEM certificate	IEEE standard must be as per the specification mentioned in the QRs.
16.2	Signalling rate, each lane (range)	1.25 Gbps +/- 100 ppm	The functionality needs to be verified by the BOO through Data Sheet.	Signalling rate must be as per the specification mentioned in the QRs.
16.3	Connector Type	Lucent connector (LC)/ physical connector (PC)	The functionality needs to be verified by the BOO through Data Sheet.	Connector type must be as per the specification mentioned in the QRs.
16.4	Fiber pairs	1	The functionality needs to be verified by the BOO through Data Sheet.	Fiber pairs must be as per the specification mentioned in the QRs.
16.5	Wavelength range	1270 nm to 1355 nm	The functionality needs to be verified by the BOO through Data Sheet.	Wavelength range must be as per the specification mentioned in the QRs.
16.6	Average transmit launch power (minimum)	-9.5 dBm	The functionality needs to be verified by the BOO through Data Sheet.	Average transmit launch power (min) must be as per the specification mentioned in the QRs.
16.7	Average transmit launch power (maximum)	-3 dBm	The functionality needs to be verified by the BOO through Data Sheet.	Average transmit launch power (max) must be as per the specification mentioned in the QRs.
16.8	Average receive power (maximum)	-3 dBm	The functionality needs to be verified by the BOO through Data Sheet.	Average receive power (max) must be as per the specification mentioned in the QRs.
16.9	Receive Sensitivity	-19 dBm (maximum)	The functionality needs to be verified by the BOO through Data Sheet.	Receive Sensitivity must be as per the specification mentioned in the QRs.
16.10	Diagnostic support	Supported	The functionality needs to be verified by the BOO through Data Sheet.	Diagnostic support must be as per the specification mentioned in the QRs.
17. . Network Video Recorder (32) Port				
17.1	Channels	32 Nos Full HD/16 Nos 4K Resolution or better	To be physically checked by the BOO.	Channels must be as per the requirement mentioned in the QRs.
17.2	Camera Type	Should Support 4K Box Camera and Full HD PTZ Cameras	The FAT report needs to be submitted & the functionality needs to be verified by the BOO.	Type of camera must be as per the requirement mentioned in the QRs.
17.3	Recording Resolution and Frame Rate	Full HD & 4K (3840x2160) @ 25 FPS or higher	The FAT report needs to be submitted & the functionality needs to be verified by the BOO.	Recording Resolution and frame rate must be as per the requirement mentioned in the QRs.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
17.4	Supported Image Resolution	HD resolution and 4K UHD Resolution	Specification to be verified by the BOO through specification sheet.	Supported image resolution must be as per the requirement mentioned in the QRs.
17.5	Operating System	**Embedded Linux/Windows based system**	Firm has submitted the OEM certificate.	Operating system must be as per the requirement mentioned in the QRs.
17.6	Video Compression	H.264,H.265 or better supporting the system	Firm has submitted the OEM certificate.	Video compression must be as per the requirement mentioned in the QRs.
17.7	Recording Bandwidth	Minimum 32 Channel full HD @320 Mbps or 16 Nos 4K resolution	The FAT report needs to be submitted & the functionality needs to be verified by the BOO.	Recording bandwidth must be as per the requirement mentioned in the QRs.
17.8	Video Playback	16 Channels Full HD synchronous play back	Specification to be verified by the BOO through specification sheet.	Video playback must be as per the requirement mentioned in the QRs.
17.9	Storage	Minimum 70 TB Usable after RAID 5/6 configuration (Combination of Internal and external)	The FAT report needs to be submitted & the functionality needs to be verified by the BOO.	Storage must be as per the requirement mentioned in the QRs.
17.10	Drive Type	SATA Surveillance HDD or better	Specification to be verified by the BOO through specification sheet.	Drive type must be as per the requirement mentioned in the QRs.
17.11	**Video In Connections**	**2x 1G Ethernet and 2x 10G Ethernet/ SFP+ connectivity**	The FAT report needs to be submitted & the functionality needs to be verified by the BOO.	Video in connections must be as per the requirement mentioned in the QRs.
17.12	Discovery Interface	OEM interface to detect the camera automatically and configure network settings	The FAT report needs to be submitted & the functionality needs to be verified by the BOO.	Discovery interface must be as per the requirement mentioned in the QRs.
17.13	Video Output/ Interface	HDMI/ VGA/ USB	To be checked physically by the BOO.	Video output/interface must be as per the requirement mentioned in the QRs.
17.14	**Network Interface**	**1-Port of Ethernet 10/100/1000 Base T ports**	To be checked physically by the BOO.	Network interface must be as per the requirement mentioned in the QRs.
17.15	USB Interface	USB 2.0 x 2, USb 3.0 x 1 or better	To be checked physically by the BOO.	USB interface must be as per the requirement mentioned in the QRs.
17.16	Monitoring	USB Mouse	To be checked physically by	Monitoring must be as per

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		Control, Digital Keyboard Control	the BOO.	the requirement mentioned in the QRs.
17.17	Multi-screen Display	Support (support on local monitor Full screen, Quad view, 4x4 (min16-view) or any other window division based on the site requirement)	The FAT report needs to be submitted & the functionality needs to be verified by the BOO.	Multi-screen display must be as per the requirement mentioned in the QRs.
17.18	Camera Control	Yes	To be checked physically by the BOO.	Camera control must be as per the requirement mentioned in the QRs.
17.19	Recording/Playback Control	Required	To be checked physically by the BOO.	Recording/playback control must be as per the requirement mentioned in the QRs.
17.20	Recording Mode	Manual, Schedule (Continuous/Event), Event (Pre/Post), Motion detection, Alarms , Trigger Input etc.	Specification to be verified by the BOO through specification sheet.	Recording mode must be as per the requirement mentioned in the QRs.
17.21	Fail over Recording	Required	To be checked physically by the BOO.	Fail over recording must be as per the requirement mentioned in the QRs.
17.22	Search and Export	Recording search by Camera, date and time. Export of video clips to USB Flash Drives.	Specification to be verified by the BOO through specification sheet.	Search and export must be as per the requirement mentioned in the QRs.
17.23	System Log	Alarms, Events, Operator Log etc.	Specification to be verified by the BOO through specification sheet.	System log must be as per the requirement mentioned in the QRs.
17.24	User Management	Authentication of User Login, Configuration of Users, User Groups and User Access Rights.	Specification to be verified by the BOO through specification sheet.	User management must be as per the requirement mentioned in the QRs.
17.25	Power Supply	Dual, Redundant	To be checked physically by the BOO.	Power supply must be as per the requirement mentioned in the QRs.
17.26	Chassis Mounting	19" Rack Mounted	To be checked physically by the BOO.	Chassis Mounting must be as per the requirement

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				mentioned in the QRs.
17.27	Regulatory Approvals/Certifications	UL, CE & FCC/BIS	Firm has submitted the OEM certificate.	Regulatory approvals/ certifications must be as per the requirement mentioned in the QRs.
Additional Functionality: The NVR should be able to synchronize video from cameras on restoration of Network after failure.				
When any failover or network interference happens, the recording should start on the SD Card in the IP Cameras, however when network recovers, the data on SD Card should be automatically transferred to NVR without any impact on operation of NVR. It should be designed to guarantee to record 24 hours of recorded data during Network failure. 50% of SD Card capacity should record at originally configured resolution into the NVR, however after 50% of SD Card storage is filled, it drops frame rate automatically to ensure minimum 24 hours back up. On Resumption of the Network, the Recording should automatically be transferred to the NVR.				
The failover should not only be supported between IP camera and NVR, but also between NVR and Failover NVR. Failover NVR is designed to support failover for multiple NVR. For example, there was 10 NVRs Are running with 1 failover NVR, the failover NVR will take its operation if any one of 10 NVR is failed				
The NVR should support Two-way Audio function Security: The cameras should be connected through a physically separate subnet mask. Limiting direct access to the cameras and increasing security				
18. . SFP Module 2.5 Gbps				
18.1	SFP transceiver can be used to connect multiple GPON optical network terminals to GPON OLT. Maximum link span can reach 60km. This transceiver is based on WDM (BiDi) technology thus it is possible to send (TX: 1310nm) and receive (RX: 1490nm) data simultaneously in both directions over single strain of fiber (optical splitters are needed to connect multiple ONTs). Module is compliant with ITU-T G.984.2 Class C+ and SFP MSA standards. Host device can access module internal EEPROM memory and DDMI via I2C interface. DDMI (Digital Diagnostic Monitoring Interface) is fully compliant with DOM.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	The specification must be as per the requirement mentioned in the QRs.
18.2	Supported transmission technology	ITU-T G.984.2	Firm has submitted the OEM certificate.	Supported transmission technology must be as per the requirement mentioned in the QRs.
18.3	Downstream throughput	2488Mbps	Firm has submitted the OEM certificate.	Downstream throughput must be as per the requirement mentioned in the QRs.
18.4	Upstream	1244Mbps	Firm has submitted the OEM	Upstream throughput

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	throughput		certificate.	must be as per the requirement mentioned in the QRs.
18.5	Transmission medium	Single-mode fibre 9/125µm	Firm has submitted the OEM certificate.	Transmission medium must be as per the requirement mentioned in the QRs.
18.6	Transmission distance	60km	Firm has submitted the OEM certificate.	Transmission distance must be as per the requirement mentioned in the QRs.
18.7	Receptacle type	SC Simplex Wavelength TX: 1490nm / RX:1310nm	Firm has submitted the OEM certificate.	Receptacle type must be as per the requirement mentioned in the QRs.
18.8	Output power/Rx sensititivy	+3~+7dBm Receiver sensitivity -31dBm	Firm has submitted the OEM certificate.	Output power must be as per the requirement mentioned in the QRs.
18.9	Power supply voltage	3.3V	Firm has submitted the OEM certificate.	Power supply voltage must be as per the requirement mentioned in the QRs.
18.10	Total power consumption	< 2W	Firm has submitted the OEM certificate.	Total power consumption must be as per the requirement mentioned in the QRs.
18.11	Operating environment	-20^0 to $+85^0$	Firm has submitted the OEM certificate.	Operating temperature must be as per the requirement mentioned in the QRs.
18.12	Operating environment	humidity 5~95% non-condensing	Firm has submitted the OEM certificate.	Operating humidity must be as per the requirement mentioned in the QRs.
19. . Industrial GPON ONT/ONU with 1X POE LAN Port				
19.1	Plug and Play	Based on automatic discovery and configuration of the ONU "Plug and Play"	To be checked physically by the BOO.	Plug and play must be as per the requirement mentioned in the QRs.
19.2	Link indication	Link Power, PON, LAN, POE+.	The functionality needs to be verified by the BOO through data sheet.	Link must be as per the requirement mentioned in the QRs.
19.3	Forwarding mode	Store and forward/ line rate forwarding	The functionality needs to be verified by the BOO through data sheet.	Forwarding mode must be as per the requirement mentioned in the QRs.
19.4	VLAN	IEEE802.1Q, VLAN tagging (Q-in-Q)	The functionality needs to be verified by the BOO through data sheet.	VLAN must be as per the requirement mentioned in the QRs.
19.5	Multicast	IGMP Snooping	The functionality needs to be	Multicast must be as per

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		V1/V2/V3	verified by the BOO through data sheet.	the requirement mentioned in the QRs.
19.6	Security :	AES encryption	The functionality needs to be verified by the BOO through data sheet.	Security must be as per the requirement mentioned in the QRs.
19.7	Compliant with:	ITU-T G.984.1, G.984.2, G.984.3, G.984.4, G.998	The functionality needs to be verified by the BOO through data sheet.	Must compliant with requirement mentioned in the QRs.
19.8	Certification	ONT/ONU should be BBF.247 Certified, UL, FCC	The functionality needs to be verified by the BOO through data sheet.	Certification must be as per the requirement mentioned in the QRs.
19.9	Quality of Service	Upgradeable dynamic DBA algorithm Rate-limiting on Ethernet and PON interface, 64K~1M bps increments Customized quality of service. IEEE802.1P QoS, scheduling policy TOS, COS, DSCP Priority, traffic	The functionality needs to be verified by the BOO through data sheet.	Quality of service must be as per the requirement mentioned in the QRs.
19.10	COS	Port-based downstream priority queues and strict priority scheduling for traffic CoS differentiation.	The functionality needs to be verified by the BOO through data sheet.	COS must be as per the requirement mentioned in the QRs.
19.11	Operation and maintenance	Standard-compliant OMCI interface as defined by G.984.4 and G.988.	The functionality needs to be verified by the BOO through data sheet.	Operation and maintenance must be as per the requirement mentioned in the QRs.
19.12	PON interface	1 PON interface optical module SC/LC connector Single mode, single-strand 1310nm upload and 1490nm download.	The functionality needs to be verified by the BOO through data sheet.	PON interface must be as per the requirement mentioned in the QRs.
19.13	PON Class	GPON optical uplink with class B+ support	The functionality needs to be verified by the BOO through data sheet.	PON Class must be as per the requirement mentioned in the QRs.
19.14	Transmit	Data TX power 0.5 ... +5 dBm	The functionality needs to be verified by the BOO through data sheet.	Transmit must be as per the requirement mentioned in the QRs.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
19.15	Receive	Data RX power -8 ... -27 dBm.	The functionality needs to be verified by the BOO through data sheet.	Receive must be as per the requirement mentioned in the QRs.
19.16	Ethernet interface	**4*10/100/1000 BASE-T POE+ interface with RJ-45 connectors. Ethernet port auto-negotiation or manual configuration with media dependent interface crossover (MDI/MDIX).**	The functionality needs to be verified by the BOO through data sheet.	Ethernet interface must be as per the requirement mentioned in the QRs.
19.17	Power supply	External power supply adapter	The functionality needs to be verified by the BOO through data sheet.	Power supply must be as per the requirement mentioned in the QRs.
19.18	Power Consumption	**≤ 150W (at max load)**	The functionality needs to be verified by the BOO through data sheet.	Power must be as per the requirement mentioned in the QRs.
19.19	Working Temperature	-40°C to 60°C (-40°F to 140°F)	The functionality needs to be verified by the BOO through data sheet.	Working temperature must be as per the requirement mentioned in the QRs.
19.20	Working Humidity	RH:5 ~ 95% non-condensing	The functionality needs to be verified by the BOO through data sheet.	Working humidity must be as per the requirement mentioned in the QRs.
19.21	Working environment	Outdoor wall or pall mounted (IP30).	The functionality needs to be verified by the BOO through data sheet.	Working environment must be as per the requirement mentioned in the QRs.
20. . GPON 8 Port OLT				
20.1	OLT Should be 19" ETSI Rack mountable with 4 slot for Line Modules		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	OLT must be 19" ETSI Rack mountable with 4 slot for Line Modules.
20.2	It should have dual DC Power supply.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	It must have dual DC Power supply.
20.3	It should be fully compliant with ITU GPON standards.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	df It must be fully compliant with ITU GPON standards.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
20.4	It should have 8 downstream GPON ports expandable to 16 downstream GPON port with addition of PON SFP and with 4 uplink GE optical/electrical/ 10 GE support.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	It must have 8 downstream GPON ports expandable to 16 downstream GPON port with addition of PON SFP and with 4 uplink GE optical/electrical/ 10 GE support.
20.5	It should be using field-proven OMCI stack and OLT management software solution.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	It must be using field-proven OMCI stack and OLT management software solution.
20.6	It should be TR-101 compliant solution for FTT x OLT applications.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	It must be TR-101 compliant solution for FTT x OLT applications.
20.7	It should have high splitter rate with support up to 128 x ONT using C+ PON SFP. It addition GPON pon port should have support of C++ SFP for -34dB Rx sensitivity.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must have high splitter rate with support up to 128 x ONT using C+ PON SFP. It addition GPON pon port should have support of C++ SFP for -34dB Rx sensitivity.
20.8	It should support uplink FEC, downlink FEC (Forward Error Correction)		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must support uplink FEC, downlink FEC (Forward Error Correction)
20.9	4096 port-IDs PER GPON MAC (downstream and upstream) & 1024 Alloc-IDs per GPON MAC (upstream).		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	The Port must be as per the requirement mentioned in the QRs.
20.10	It should static & Dynamic Bandwidth Allocation.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must static & dynamic bandwidth allocation.
20.11	It should support Port-based QinQ and Selective QinQ (Stack VLAN).		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must support Port-based QinQ and selective QinQ (Stack VLAN).
20.12	It should support Port-based/MAC-based/IP subnet-based VLAN.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must support Port-based/MAC-based/IP subnet-based VLAN.
20.13	It should support IEEE 802. 1D		The FAT report needs to be	Must support IEEE 802.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	Spanning Tree Protocol (STP)		submitted and the functionality need to be verified by the firm in presence of BOO.	1D spanning Tree Protocol (STP.
20.14	It should support IEEE 802.1w rapid Spanning Tree Protocol (RSTP) IEEE 802. 1s		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must support IEEE 802. 1w rapid spanning Tree Protocol (RSTP) IEEE 802.1s.
20.15	It should have multiple spanning tree protocol instances (MSTP) Bi-directional bandwidth control. It should have static link aggregation and LACP (Link Aggregation Control Protocol)		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must have multiple spanning tree protocol instances (MSTP) Bi-directional bandwidth control. Must have static link aggregation and LACP (Link Aggregation Control Protocol).
20.16	It should have port mirroring and traffic mirroring		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must have port mirroring and traffic mirroring.
20.17	It should have rate-limit to packet sending/receiving speed of port of self-defined flow and provide general flow monitor and two-speed tri-color monitor of self-defined flow.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must have rate-limit to packet sending/receiving speed of port of self-defined flow and provide general flow monitor and two-speed tri-color monitor of self-defined flow.
20.18	It should have priority remark to port or self-defined flow and provide 802. 1P, DSCP priority and remark		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must have priority remark to port or self-defined flow and provide 802.1P, DSCP priority and remark.
20.19	It should have CAR (committed Access Rate), Traffic Shaping and flow statistics Packet mirror and redirection of interface and self-defined flow.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must have CAR (committed Access Rate), Traffic Shaping and flow statistics Packet mirror and redirection of interface and self-defined flow.
20.20	It should support ERPS(recover-time <200 ms), RSTP/MSTP (recover time <1s) & LACP (recover-time < 200 ms)		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must support ERPS(recover-time <200 ms), RSTP/MSTP (recover time <1s) & LACP (recover-time < 200 ms)
20.21	OLT Power consumption should be <= 270w		The FAT report needs to be submitted and the functionality need to be verified by the firm in	OLT Power consumption must be <= 270w.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
			presence of BOO.	
20.22	It should have super queue scheduler based on port and self-defined flow. Each port/flow supports 8 priority queues and scheduler of SP, WRR and SP+ WRR.		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must have super queue scheduler based on port and self-defined flow. Each port/flow supports 8 priority queues and scheduler of SP, WRR and SP+ WRR.
20.23	It should support congestion avoid mechanism including Tail Drop and WRED		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Must support congestion avoid mechanism including Tail Drop and WRED.
20.24	**OLT should have switching capacity of 480 Gbps or higher**		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	OLT must have switching capacity of 480 Gbps or higher.
20.25	IPv4 ARP Proxy DHCP Relay Static route IPv6		The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Port must be as per the requirement mentioned in the QRs.
21. QRs/Specification of EMS Software for Managing GPON Equipment				
21.1	Based on standard SNMP protocol		The functionality needs to be verified by the board of officers.	The SNMP protocol must be as per requirement mentioned in the QRs.
21.2	Support multiple client access, C/S architecture		The functionality needs to be verified by the board of officers.	Client access, C/S architecture must be as per requirement mentioned in the QRs.
21.3	Support integrated management all our EPON/GPON series products		The functionality needs to be verified by the board of officers.	Must support integrated managed all our EPON/GPON series products.
21.4	Support auto topology or modify manually, and multi-layer map view		The functionality needs to be verified by the board of officers.	Must support auto topology or modify manually, and multi-layer map view.
21.5	Support configuration operation on all EPON/GPON products functions		The functionality needs to be verified by the board of officers.	Must support configuration operation on all EPON/GPON products functions
21.6	Support multiple level operation authority		The functionality needs to be verified by the board of officers.	Must support multiple level operation authority.
21.7	Real-time and history alarm record view, search and save		The functionality needs to be verified by the board of officers.	Must have real-time and history alarm record view, search and save.
21.8	Operation history record trace and		The functionality needs to be	Must have operation

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	save		verified by the board of officers.	history record trace and save.
21.9	Use independent database and support data backup and import		The functionality needs to be verified by the board of officers.	Software must use independent database and support data backup and import.
21.10	Support performance monitor and traffic counters statistic		The functionality needs to be verified by the board of officers.	Must support performance monitor and traffic counters statistic.
21.11	The EMS is must be able to run on a Linux/Windows platform.		The functionality needs to be verified by the board of officers.	The specification must be as per the requirement mentioned the QRs.
21.12	The network representation shall be based on a tree like structure as well as in a graphical structure.		The functionality needs to be verified by the board of officers.	The network representation must be based on a tree like structure as well as in a graphical structure.
21.13	Support Map view with Google MAP		The functionality needs to be verified by the board of officers.	Must support map view with Google Map.
21.14	The proposed EMS has the capability to support very large networks in a single instance.		The functionality needs to be verified by the board of officers.	The specification must be as per the requirement mentioned the QRs.
21.15	Hardware or software upgrade of the EMS must not affect end-user services.		The functionality needs to be verified by the board of officers.	The specification must be as per the requirement mentioned the QRs.
21.16	System upgrades must be performed from the operator position without requiring any on-site visit.		The functionality needs to be verified by the board of officers.	The specification must be as per the requirement mentioned the QRs.
21.17	Compatibility between different versions of NE software must be maintained via "plug-in" architecture. Concurrency of different NE software versions must be supported without service degradation.		The functionality needs to be verified by the board of officers.	Compatibility must be as per the requirement mentioned the QRs.
21.18	The EMS should allow for the selection of a default map/list for some operators or group of operators. The default map/list shall be defined by the EMS Administrator.		The functionality needs to be verified by the board of officers.	The EMS must allow for the selection of a default map/list for some operators or group of operators. The default map/list must be defined by the EMS Administrator.
21.19	The EMS shall update automatically and in real time all local and remote Network Management operator maps/lists after a NE is added on the map/list or the NE settings on the map/list are modified (e.g. the		The functionality needs to be verified by the board of officers.	The EMS must update automatically and in real time all local and remote Network Management operator maps/lists after a NE is added on the map/list or the NE settings

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	name, ...)			on the map/list are modified (e.g. the name, ...)
21.20	The EMS must be able to provide a tool to move the NE's amongst the map/list in order to restructure the network.		The functionality needs to be verified by the board of officers.	The specification must be as per the requirement mentioned the QRs.
22. . 08-Port POE Managed Industrial Switch				
22.1	Ethernet	Operating mode: Store and forward, L2 wire-speed/non-blocking switching engine, MAC address: 8K/16 K or better, Jumbo Frame : 9K bytes	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	The Ethernet must be as per requirement mentioned in the QRs.
22.2	Copper RJ45 Ports	**Speed: 8 nos of POE+ Ports. Speed of 10/100/1000 Mbps • MDI/MDIX Auto**	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Copper RJ45 Ports must be as per requirement mentioned in the QRs.
22.3	SFP (Pluggable) Ports	Port types supported: 4GE SFP Port	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	SFP (Pluggable) Ports must be as per requirement mentioned in the QRs.
22.4	Network Redundancy	Fast failover protection rings: - Support Single & Multiple rings; Ring coupling; Dual-homing, VLAN: 4K, IEEE 802.1Q tag based VLANs, rapid ring protection with self-recovery time in **50 ms** or better.	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Network redundancy must be as per requirement mentioned in the QRs.
22.5	IEEE 802.1ad Double Tagging (Qin Q)	Multicast protocols: - IGMP with up to 1000 multicast groups - IGMP snooping and querying, static routing.	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	IEEE 802.1ad Double Tagging (Qin Q) must be as per requirement mentioned in the QRs.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
22.6	Chain	Spanning Tree Protocol: IEEE 802.1D STP bridge	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Chain must be as per requirement mentioned in the QRs.
22.7	Traffic management &QoS	Priority: IEEE 802.1p QoS • Number of queues per port: 4 egress • Ingress Policing, Rate-Limit, Egress Queuing/shaping, QoS, Ethernet QoS	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Traffic management & QoS must be as per requirement mentioned in the QRs.
22.8	Security	Port security: - IP and MAC-based access control IEEE 802.1X authentication Network Access Control - RADIUS and TACACS+ AAA (Authentication, Accounting and Authorization) • Storm Control: Multicast/Broadcast/Flooding	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Security must be as per requirement mentioned in the QRs.
22.9	Management	User Management interfaces: - CLI (command line interface), Console - WEB-based Management - SNMP v1, v2c, v3 - Telnet	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Management must be as per requirement mentioned in the QRs.
22.10	Management Security:	RFC 2068: HTTP, SSH - Radius Client for Management • Upgrade & Restore: FTP for Configuration Import/Export, FTP for Firmware Upgrade • Diagnostic: Syslog • MIBs: - RFC 1757 RMON 1,2,3,9; RFC-	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Management Security must be as per requirement mentioned in the QRs.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
		1493 Bridge MIB; RFC 2233 IF MIB • DHCP: Client, Server, Relay, Snooping, Option 82 • NTP/SNTP: Yes • System status: Device info/status; Ethernet port status; PoE status •		
22.11	Power Input	Redundant Input Terminals • Input voltage range: 48-57 VDC	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Power input must be as per requirement mentioned in the QRs.
22.12	Indicators	Ethernet port indication: Link & Speed through LEDs.	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Indicators must be as per requirement mentioned in the QRs.
22.13	Environmental & Compliances	Operating temperature range: -40 to +70°C (Storage temperature range: -40 to +70 °C Humidity (non-condensing): 5 to 95% RH RoHS: RoHS (Pb free) • MTBF: > 25 years	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Environmental & Compliances must be as per requirement mentioned in the QRs.
22.14	Mechanical	Ingress protection: IP30 • Installation option: DIN-Rail mounting	The FAT report needs to be submitted and the functionality need to be verified by the firm in presence of BOO.	Mechanical must be as per requirement mentioned in the QRs.
23. Command Control & Analytical Software				
S No.	Specification		Trial procedure suggested by the BOO.	Result expected/desired
1	**Requirement :**			
	The requirements VMS System shall be as below			
1.1	**Management Software**			
1.1.1	This shall be a highly scalable enterprise level software solution. It shall offer a complete video surveillance solution that will be scalable to required numbers of		The functionality needs to be verified by the BOO through Data Sheet.	Software must be a highly scalable enterprise level software solution. It must offer a complete video surveillance solution that

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	sensors that can be added on a unit-by-unit basis.			will be scalable to required numbers of sensors that can be added on a unit-by-unit basis.
1.1.2	The Management Software shall be licensed and shall operate on open architecture and shall require no proprietary IT hardware.		The functionality needs to be verified by the BOO through Data Sheet.	The Management Software must be licensed and must operate on open architecture and shall require no proprietary IT hardware.
1.1.3	The Management Software shall allow for video to be streamed on workstation I in Matrix or on a video wall.		The functionality needs to be verified by the BOO through Data Sheet.	The Management Software must allow for video to be streamed on workstation I in Matrix or on a video wall.
1.1.4	The user with administrative rights shall create clients (users) and give access to the software client application based on predefined user access rights.		The functionality needs to be verified by the BOO through Data Sheet.	The user with administrative rights must create clients (users) and give access to the software client application based on predefined user access rights.
1.1.5	The system shall allow the recording, live monitoring, playback of archived video and data simultaneously.		The functionality needs to be verified by the BOO through Data Sheet.	The system must allow the recording, live monitoring, playback of archived video and data simultaneously.
1.1.6	The software shall provide the following:		The functionality needs to be verified by the BOO through Data Sheet.	The software must provide the following
1.1.6.1	Several simultaneous live picture connections of camera in network.		The functionality needs to be verified by the BOO through Data Sheet.	Several simultaneous live picture connections of camera in network.
1.1.6.2	Configuration of monitoring situation (2 Dimensional Multi-Level site maps).		The functionality needs to be verified by the BOO through Data Sheet.	Configuration of monitoring situation (2 Dimensional Multi-Level site maps).
1.1.6.3	Programming of alarm-triggered automatic events in various alarms configuration.		The functionality needs to be verified by the BOO through Data Sheet.	Programming of alarm-triggered automatic events in various alarms configuration.
1.1.6.4	System set up with limited operation options for clearly defined surveillance tasks.		The functionality needs to be verified by the BOO through Data Sheet.	System set up with limited operation options for clearly defined surveillance tasks.
1.1.6.5	Programming of automatic recording events on a network recorder.		The functionality needs to be verified by the BOO through Data Sheet.	Programming of automatic recording events on a network recorder.
1.1.7	The software shall display dual H.264 video streams in real time simultaneously at frame rates		The functionality needs to be verified by the BOO through Data Sheet.	The software must display dual H.264 video streams in real time

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	ranging from 1 fps to 25 fps and resolution ranging Full HD to other HD/SD resolution.			simultaneously at frame rates ranging from 1 fps to 25 fps and resolution ranging Full HD to other HD/SD resolution.
1.1.8	Each camera's bit rate, frame rate and resolution shall be set independently from other cameras in the system, and altering these settings shall not affect the recording and display settings of other cameras.		The functionality needs to be verified by the BOO through Data Sheet.	Each camera's bit rate, frame rate and resolution must be set independently from other cameras in the system, and altering these settings may not affect the recording and display settings of other cameras.
1.1.9	The software shall provide automatic search and discovery of components of video surveillance system on the network, which can be network sensors		The functionality needs to be verified by the BOO through Data Sheet.	The software must provide automatic search and discovery of components of video surveillance system on the network, which can be network sensors
1.1.10	The software shall provide drag & drop functions on the system and also for setup of connection between sensors and monitors connected to one workstation		The functionality needs to be verified by the BOO through Data Sheet.	The software must provide drag & drop functions on the system and also for setup of connection between sensors and monitors connected to one workstation
1.1.11	The software shall allow:		The functionality needs to be verified by the BOO through Data Sheet.	The software must allow:
1.1.11.1	Live display of sensor feed		The functionality needs to be verified by the BOO through Data Sheet.	Live display of sensor feed
1.1.11.2	Live display of sensor sequences.		The functionality needs to be verified by the BOO through Data Sheet.	Live display of sensor sequences.
1.1.11.3	Control and integration of sensors using third party API/SDK integration including EO, Radar, IRIDS,UGS,UAV,PTZ etc		The functionality needs to be verified by the BOO through Data Sheet.	Control and integration of sensors using third party API/SDK integration including EO, Radar, IRIDS,UGS,UAV,PTZ etc
1.1.11.4	Playback of archived video		The functionality needs to be verified by the BOO through Data Sheet.	Playback of archived video
1.1.11.5	Retrieval of archived video.		The functionality needs to be verified by the BOO through Data Sheet.	Retrieval of archived video.
1.1.11.6	Instant Replay of live video.		The functionality needs to be verified by the BOO through Data Sheet.	Instant Replay of live video.
1.1.11.	Use of site maps.		The functionality needs to be	Use of site maps.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
7			verified by the BOO through Data Sheet.	
1.1.11.8	Configuration of system settings.		The functionality needs to be verified by the BOO through Data Sheet.	Configuration of system settings.
1.1.11.9	Configuration and programming of P/T/Z cameras, features like auto tours, presets etc.		The functionality needs to be verified by the BOO through Data Sheet.	Configuration and programming of P/T/Z cameras, features like auto tours, presets etc.
1.1.10	The software shall be able to do video recording on any of the following options - inbuilt hard disks on the server, direct attached storage boxes attached to servers, network attached storage, storage area network.		The functionality needs to be verified by the BOO through Data Sheet.	The software must be able to do video recording on any of the following options - inbuilt hard disks on the server, direct attached storage boxes attached to servers, network attached storage, storage area network.
1.1.11	The software shall be capable of handling sensors and alarm icons on area maps. The area map shall be configurable to pop up upon the receipt of an alarm received from a sensor on the map. This can be on the same or other monitors on the PC.		The functionality needs to be verified by the BOO through Data Sheet.	The software must be capable of handling sensors and alarm icons on area maps. The area map must be configurable to pop up upon the receipt of an alarm received from a sensor on the map. This can be on the same or other monitors on the PC.
1.1.12	The software shall be able to select the required recording based on the time recording was activated, the duration of recording, operator activated recording, event activated recording, scheduled recording.		The functionality needs to be verified by the BOO through Data Sheet.	The software must be able to select the required recording based on the time recording was activated, the duration of recording, operator activated recording, event activated recording, scheduled recording.
1.1.13	The software shall provide a reporting utility for tracking for the following minimum options. Video clips and image snapshots shall be stored with reports for documenting events		The functionality needs to be verified by the BOO through Data Sheet.	The software must provide a reporting utility for tracking for the following minimum options. Video clips and image snapshots shall be stored with reports for documenting events
1.1.13.1	Alarms		The functionality needs to be verified by the BOO through Data Sheet.	Alarms
1.1.13.2	Incidents		The functionality needs to be verified by the BOO through Data Sheet.	Incidents

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
1.1.13.3	Operator logs		The functionality needs to be verified by the BOO through Data Sheet.	Operator logs
1.1.14	The software shall have the facility to export the desired portion of clipping of video from a desired date/time to another desired date/time on DVD/ on any client/ network storage device. Viewing of this recording shall be possible on authorized player which shall be provided by software manufacturer or in media player on computer utilizing a Window environment.		The functionality needs to be verified by the BOO through Data Sheet.	The software must have the facility to export the desired portion of clipping of video from a desired date/time to another desired date/time on DVD/ on any client/ network storage device. Viewing of this recording shall be possible on authorized player which shall be provided by software manufacturer or in media player on computer utilizing a Window environment.
1.1.15	The Video Management servers shall not limit the number of network video recording servers which can be networked together to form video management and recording system		The functionality needs to be verified by the BOO through Data Sheet.	The Video Management servers must not limit the number of network video recording servers which can be networked together to form video management and recording system
1.1.16	The Video Management servers shall maintain a catalogue of settings for all the clients, servers, and IP cameras & IP enabled cameras in the system. If Video Management servers & recording cannot be managed by single server, in such cases, additional server shall be provided.		The functionality needs to be verified by the BOO through Data Sheet.	The Video Management servers must maintain a catalogue of settings for all the clients, servers, and IP cameras & IP enabled cameras in the system. If Video Management servers & recording cannot be managed by single server, in such cases, additional server shall be provided.
1.1.17	The software shall enable the client to dynamically create connections between sensors and clients and view live or recorded video on Monitors.		The functionality needs to be verified by the BOO through Data Sheet.	The software must enable the client to dynamically create connections between sensors and clients and view live or recorded video on Monitors.
1.1.18	The software shall provide the client seamless operation of all sensors and clients available in the system regardless of the actual connection to different		The functionality needs to be verified by the BOO through Data Sheet.	The software must provide the client seamless operation of all sensors and clients available in the system regardless of the

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	Network Video Recording servers.			actual connection to different Network Video Recording servers.
1.1.19	The software shall detect signal loss of sensors and have the capability to alert the systems administrator.		The functionality needs to be verified by the BOO through Data Sheet.	The software must detect signal loss of sensors and have the capability to alert the systems administrator.
1.1.20	The software shall receive all incoming events (motion detection and triggered digital input and relay output) in the system and take appropriate actions based on user-defined event/action relationships.		The functionality needs to be verified by the BOO through Data Sheet.	The software must receive all incoming events (motion detection and triggered digital input and relay output) in the system and take appropriate actions based on user-defined event/action relationships.
1.1.21	The software shall create an audit trail of all events and user activities.		The functionality needs to be verified by the BOO through Data Sheet.	The software must create an audit trail of all events and user activities.
1.1.22	The Management Software shall support the following:-		The functionality needs to be verified by the BOO through Data Sheet.	The Management Software must support the following:-
1.1.23	The Management Software shall provide a full matrix operation of IP video to display monitors.		The functionality needs to be verified by the BOO through Data Sheet.	The Management Software must provide a full matrix operation of IP video to display monitors.
1.1.24	The Management Software shall have the capability of creating sensors sequences with the following functionalities:		The functionality needs to be verified by the BOO through Data Sheet.	The Management Software must have the capability of creating sensors sequences with the following functionalities:
1.1.24.1	Each Sequence shall have capability up to hundreds of sensors.		The functionality needs to be verified by the BOO through Data Sheet.	Each Sequence must have capability up to hundreds of sensors.
1.1.24.2	Each sensors in the sequence shall have its own individual dwell time, from 1 to 60 seconds.		The functionality needs to be verified by the BOO through Data Sheet.	Each sensors in the sequence must have its own individual dwell time, from 1 to 60 seconds.
1.1.24.3	Multiple users shall be able to view the same sensors sequence simultaneously, not necessarily synchronized nor with the other.		The functionality needs to be verified by the BOO through Data Sheet.	Multiple users must be able to view the same sensors sequence simultaneously, not necessarily synchronized nor with the other.
1.1.25	The software shall provide alarm management module.		The functionality needs to be verified by the BOO through Data Sheet.	The software must provide alarm management module.
1.1.25.1	The alarm management shall be able to set any monitor or groups of monitors to automatically		The functionality needs to be verified by the BOO through Data Sheet.	The alarm management must be able to set any monitor or groups of

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	display sensors in response to alarm inputs.			monitors to automatically display sensors in response to alarm inputs.
1.1.25.2	The alarm management shall be able to reset automatically or manually alarmed video		The functionality needs to be verified by the BOO through Data Sheet.	The alarm management must be able to reset automatically or manually alarmed video
1.1.26	It shall be possible to search for recordings in the software by sensors, date and time. If a data and time is specified, playback shall commence from that date and time. It shall be possible to playback more than one sensors simultaneously		The functionality needs to be verified by the BOO through Data Sheet.	It must be possible to search for recordings in the software by sensors, date and time. If a data and time is specified, playback shall commence from that date and time. It shall be possible to playback more than one sensors simultaneously
1.1.27	The software shall support at least 64 video streams concurrently. It shall support at least 4 monitors in one server/ workstation for displaying live video. It shall allow minimum 5 levels of user and alarm prioritization. It shall allow minimum 16 sensors to be replayed simultaneously.		The functionality needs to be verified by the BOO through Data Sheet.	The software must support at least 64 video streams concurrently. It shall support at least 4 monitors in one server/ workstation for displaying live video. It must allow minimum 5 levels of user and alarm prioritization. It must allow minimum 16 sensors to be replayed simultaneously.
1.1.28	The VMS shall be seamlessly integrated with Face recognition Software and have capability to receive the alerts.		The functionality needs to be verified by the BOO through Data Sheet.	The VMS must be seamlessly integrated with Face recognition Software and have capability to receive the alerts.
1.2	**Graphic User Interface Client Software Features**			
1.2.1	The GUI software shall perform the following applications simultaneously without interfering with any of the storage server operations (recording, alarms, etc.):		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must perform the following applications simultaneously without interfering with any of the storage server operations (recording, alarms, etc.):
1.2.1.1	Live display of sensors		The functionality needs to be verified by the BOO through Data Sheet.	Live display of sensors
1.2.1.2	Live display of sensors sequences.		The functionality needs to be verified by the BOO through Data Sheet.	Live display of sensors sequences.
1.2.1.3	Control of PTZ cameras / sensors		The functionality needs to be verified by the BOO through	Control of PTZ cameras / sensors

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
			Data Sheet.	
1.2.1.4	Playback of archived video.		The functionality needs to be verified by the BOO through Data Sheet.	Playback of archived video.
1.2.1.5	Retrieval of archived video		The functionality needs to be verified by the BOO through Data Sheet.	Retrieval of archived video
1.2.1.6	Instant replay of live video.		The functionality needs to be verified by the BOO through Data Sheet.	Instant replay of live video.
1.2.1.7	Use of graphical controls (maps) and alarm management.		The functionality needs to be verified by the BOO through Data Sheet.	Use of graphical controls (maps) and alarm management.
1.2.1.8	Configuration of system settings.		The functionality needs to be verified by the BOO through Data Sheet.	Configuration of system settings.
1.2.2	The GUI software shall support any form of IP network connectivity including LAN, WAN and wireless LAN technologies.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must support any form of IP network connectivity including LAN, WAN and wireless LAN technologies.
1.2.3	The GUI software shall support multicast and unicast video streaming.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must support multicast and unicast video streaming.
1.2.4	The GUI software shall provide an authentication mechanism, which verifies the validity of the user.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must provide an authentication mechanism, which verifies the validity of the user.
1.2.5	The GUI software shall allow for live monitoring of video.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must allow for live monitoring of video.
1.2.6	It shall enable view of 1 to minimum 16 video tiles simultaneously on a single digital monitor at 25 fps per camera		The functionality needs to be verified by the BOO through Data Sheet.	It must enable view of 1 to minimum 16 video tiles simultaneously on a single digital monitor at 25 fps per camera
1.2.7	The software shall provide on each of the digital monitors independently the following tile views		The functionality needs to be verified by the BOO through Data Sheet.	The software must provide on each of the digital monitors independently the following tile views
1.2.7.1	Full screen		The functionality needs to be verified by the BOO through Data Sheet.	Full screen
1.2.7.2	Quad view		The functionality needs to be verified by the BOO through Data Sheet.	Quad view
1.2.7.3	4x4 (16-view)		The functionality needs to be verified by the BOO through Data Sheet.	4x4 (16-view)
1.2.7.4	The Software shall also support		The functionality needs to be	The Software must also

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	any other window division based on the site requirement		verified by the BOO through Data Sheet.	support any other window division based on the site requirement
1.2.7.5	The GUI software shall allow operators to view an instant replay of any Camera.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must allow operators to view an instant replay of any Camera.
1.2.7.6	The operator shall be able to define the amount of time he wishes to go back from a timeline bar or through a custom setup period.		The functionality needs to be verified by the BOO through Data Sheet.	The operator must be able to define the amount of time he wishes to go back from a timeline bar or through a custom setup period.
1.2.8	The operator shall be able to control the playback with play, pause, forward, and speed buttons.		The functionality needs to be verified by the BOO through Data Sheet.	The operator must be able to control the playback with play, pause, forward, and speed buttons.
1.2.9	The operator shall be able to choose and trigger following minimum action from a macro/site map:		The functionality needs to be verified by the BOO through Data Sheet.	The operator must be able to choose and trigger following minimum action from a macro/site map:
1.2.9.1	View Camera/sensors in a video tile.		The functionality needs to be verified by the BOO through Data Sheet.	View Camera/sensors in a video tile.
1.2.9.2	View map or procedure in a video tile.		The functionality needs to be verified by the BOO through Data Sheet.	View map or procedure in a video tile.
1.2.9.3	Starting/stopping PTZ pattern.		The functionality needs to be verified by the BOO through Data Sheet.	Starting/stopping PTZ pattern.
1.2.9.4	Go to PTZ preset.		The functionality needs to be verified by the BOO through Data Sheet.	Go to PTZ preset.
1.2.10	The GUI software shall provide management and control over the system using a standard PC mouse, keyboard and Digital keyboard.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must provide management and control over the system using a standard PC mouse, keyboard and Digital keyboard.
1.2.11	The GUI software shall display all sensors attached to the system regardless of their physical location on the network.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must display all sensors attached to the system regardless of their physical location on the network.
1.2.12	The GUI software shall display all sensors sequences created in the system.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must display all sensors sequences created in the system.
1.2.13	The GUI software shall allow operators to control (pause/play,		The functionality needs to be verified by the BOO through	The GUI software must allow operators to control

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	skip forwards, skip backwards) camera sequences.		Data Sheet.	(pause/play, skip forwards, skip backwards) camera sequences.
1.2.14	The GUI software shall display all sensors, sequences and users in a logical tree		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must display all sensors, sequences and users in a logical tree
1.2.15	The GUI software operator shall be able to drag and drop a camera from a tree of available cameras into any video tile for live viewing.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software operator must be able to drag and drop a camera from a tree of available cameras into any video tile for live viewing.
1.2.16	The GUI software operator shall be able to view the sensors from a tree of available cameras into any video tile for live viewing.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software operator must be able to view the sensors from a tree of available cameras into any video tile for live viewing.
1.2.17	The GUI software shall support graphical site representation (map) functionality, where digital maps are used to represent the physical location of cameras and other devices throughout facility.		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must support graphical site representation (map) functionality, where digital maps are used to represent the physical location of cameras and other devices throughout facility.
1.2.18	The maps shall have the ability to contain hyperlinks to create a hierarchy of interlinked maps.		The functionality needs to be verified by the BOO through Data Sheet.	The maps must have the ability to contain hyperlinks to create a hierarchy of interlinked maps.
1.2.19	The GUI software operator shall be able to view the sensors from a map into a video tile for live viewing in the same browser without opening a new browser		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software operator must be able to view the sensors from a map into a video tile for live viewing in the same browser without opening a new browser
1.2.20	The operator shall be able to click on an icon in a map to initiate PTZ camera preset, run PTZ pattern, view camera in an analog monitor or send an 1/0 stream		The functionality needs to be verified by the BOO through Data Sheet.	The operator must be able to click on an icon in a map to initiate PTZ camera preset, run PTZ pattern, view camera in an analog monitor or send an 1/0 stream
1.2.21	The GUI software shall support digital zoom on a fixed camera's live video streams		The functionality needs to be verified by the BOO through Data Sheet.	The GUI software must support digital zoom on a fixed camera's live video streams
.1.2.22	The GUI software shall support		The functionality needs to be	The GUI software must

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	digital zoom on a PTZ camera's live video streams.		verified by the BOO through Data Sheet.	support digital zoom on a PTZ camera's live video streams.
1.2.23	The operator shall be able to control Pan, Tilt and Zoom patterns of P/T/Z Camera		The functionality needs to be verified by the BOO through Data Sheet.	The operator must be able to control Pan, Tilt and Zoom patterns of P/T/Z Camera
1.2.24	The software shall be able to display video of cameras on 55 inch Large Format Display Monitors and Workstation Monitors.		The functionality needs to be verified by the BOO through Data Sheet.	The software must be able to display video of cameras on 55 inch Large Format Display Monitors and Workstation Monitors.
1.2.25	The software shall allow the control of display from the client PC.		The functionality needs to be verified by the BOO through Data Sheet.	The software must allow the control of display from the client PC.
1.2.26	The operator from the GUI software shall be able to decide the screen layout and also the cameras that shall be displayed on the monitors.		The functionality needs to be verified by the BOO through Data Sheet.	The operator from the GUI software must be able to decide the screen layout and also the cameras that shall be displayed on the monitors.
1.2.27	The software shall support multicasting.		The functionality needs to be verified by the BOO through Data Sheet.	The software must support multicasting.
1.2.28	It shall be possible to switch the screen layout in response to an alarm.		The functionality needs to be verified by the BOO through Data Sheet.	It must be possible to switch the screen layout in response to an alarm.
1.2.29	The GUI Software shall support text superimposing the title and date & time on the video		The functionality needs to be verified by the BOO through Data Sheet.	The GUI Software must support text superimposing the title and date & time on the video
1.3	**Video Recording Software**			
1.3.1	Software shall support recording of H.264/H.265 video streams. It shall support recording of video and audio for all the channels.		The functionality needs to be verified by the BOO through Data Sheet.	Software must support recording of H.264/H.265 video streams. It must support recording of video and audio for all the channels.
1.3.2	Software shall support triplex applications, recording, re-play and backup simultaneously. It shall be compatible with windows Server OS or Linux for highest performance and reliability.		The functionality needs to be verified by the BOO through Data Sheet.	Software must support triplex applications, recording, re-play and backup simultaneously. It must be compatible with windows Server OS or Linux for highest performance and reliability.
1.3.3	The software shall support absolute recording redundancy with X to N, N to X and N to N		The functionality needs to be verified by the BOO through Data Sheet.	The software must support absolute recording redundancy with X to N, N

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	redundancy configurations for recording severs. This feature shall be provided, if specified by purchaser.			to X and N to N redundancy configurations for recording severs. This feature must be provided, if specified by purchaser.
1.3.4	Software shall operate on open architecture and shall not require any proprietary hardware.		The functionality needs to be verified by the BOO through Data Sheet.	Software must operate on open architecture and must not require any proprietary hardware.
1.3.5	Software shall be able to record minimum 64 different video streams or more simultaneously. It shall be accessible from any client PC connected to the network.		The functionality needs to be verified by the BOO through Data Sheet.	Software must be able to record minimum 64 different video streams or more simultaneously. It must be accessible from any client PC connected to the network.
1.3.6	Software shall provide network time server function to ensure the synchronization of the video servers and the recordings		The functionality needs to be verified by the BOO through Data Sheet.	Software must provide network time server function to ensure the synchronization of the video servers and the recordings
1.3.7	The servers shall be connected to the network so that these can be placed at any location, which has network access. The software shall be able to receive alarms of different types from equipment to start a recording. These alarms can be motion detection, video loss, and unified picture and trigger input.		The functionality needs to be verified by the BOO through Data Sheet.	The servers must be connected to the network so that these can be placed at any location, which has network access. The software must be able to receive alarms of different types from equipment to start a recording. These alarms can be motion detection, video loss, unified picture and trigger input.
1.3.8	The software alarm recording shall support pre-and post-alarm periods. Both can be configured in duration.		The functionality needs to be verified by the BOO through Data Sheet.	The software alarm recording must support pre-and post-alarm periods. Both can be configured in duration.
1.3.9	The software shall provide a status of the available recording capacity.		The functionality needs to be verified by the BOO through Data Sheet.	The software must provide a status of the available recording capacity.
1.3.10	**Fault Tolerant Recording:**			
1.3.11	If software & server(s) operation are interrupted, like power disconnection and once the server(s) are restarted, these shall automatically resume recording of any cameras these were recording prior to the		The functionality needs to be verified by the BOO through Data Sheet.	If software & server(s) operation are interrupted, like power disconnection and once the server(s) are restarted, these shall automatically resume recording of any cameras

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	interruption.			these were recording prior to the interruption.
1.3.12	The software shall support network fault-tolerant recording such that if the network connection between a video management server and video recording server becomes unavailable, for example through cable breakage, network congestion or WLAN interruption, the system operation shall automatically recover when the connection is restored.		The functionality needs to be verified by the BOO through Data Sheet.	The software must support network fault-tolerant recording such that if the network connection between a video management server and video recording server becomes unavailable, for example through cable breakage, network congestion or WLAN interruption, the system operation shall automatically recover when the connection is restored.
1.4	**Search & Export**			
1.4.1	It shall be possible to search for recordings in the software by camera, date and time. If a data and time is specified, playback shall commence from that date and time. It shall be possible to playback more than one camera simultaneously.		The functionality needs to be verified by the BOO through Data Sheet.	It must be possible to search for recordings in the software by camera, date and time. If a data and time is specified, playback shall commence from that date and time. It must be possible to playback more than one camera simultaneously.
1.4.2	The software shall be able to export sections of recordings to a separate Windows folder, which can then be written to CD-ROM, DVD-ROM or USB Flash Drives etc. to be played back at a location not connected to the network video management & recording network. The export process shall make available a player application, which can be provided with the exported video. Export shall be possible in Windows media player or any other media player compatible format. Simultaneous export of multiple cameras shall also be possible.		The functionality needs to be verified by the BOO through Data Sheet.	The software must be able to export sections of recordings to a separate Windows folder, which can then be written to CD-ROM, DVD-ROM or USB Flash Drives etc. to be played back at a location not connected to the network video management & recording network. The export process must make available a player application, which can be provided with the exported video. Export shall be possible in Windows media player or any other media player compatible format. Simultaneous export of

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				multiple cameras shall also be possible.
1.4.3	The VMS should be able to integrate with IRIDISS and raise an alarm. It should support intelligent logics for entry-exit, entry-exitentry. It should also be able to detect multiple entry, false entry, division of intruders etc		The functionality needs to be verified by the BOO through Data Sheet.	The VMS must be able to integrate with IRIDIS and raise an alarm. It must support intelligent logics for entry-exit, entry-exitentry. It must also be able to detect multiple entry, false entry, division of intruders etc
1.4.4	VMS Should be able to integrate to unmanned ground sensors. This should be depicted on the live map with highlighting of zone of intrusion		The functionality needs to be verified by the BOO through Data Sheet.	VMS must be able to integrate to unmanned ground sensors. This must be depicted on the live map with highlighting of zone of intrusion
1.4.5	The VMS should be able to integrate with with exiting surveillance equipment. It should be able to highlight any movement of humans and vehicles under no light conditions and pop up alerts on the alert screen.		The functionality needs to be verified by the BOO through Data Sheet.	The VMS must be able to integrate with exiting surveillance equipment. It should be able to highlight any movement of humans and vehicles under no light conditions and pop up alerts on the alert screen
1.4.6	The Command Control Software should be integrated to GIS Maps to support position of cameras with Lat/Long. In addition should be DMR ready to integrate the Police DMR sets for live display of location of policemen in the venue.		The functionality needs to be verified by the BOO through Data Sheet.	The Command Control Software must be integrated to GIS Maps to support position of cameras with Lat/Long. In addition must be DMR ready to integrate the Police DMR sets for live display of location of policemen in the venue.
1.4.7	**Additional Feature**			
1.4.7.1.	The software should have an integrated Video Analytics to support following Features: i. Tripwire/Zone marking ii. Person moving in/out of an Area Ill. Un attended object Detection iv. Facial Recognition v. Person counting / Loitering /Tracking		The functionality needs to be verified by the BOO through Data Sheet.	The software must have an integrated Video Analytics to support following Features: i. Tripwire/Zone marking ii. Person moving in/out of an Area Ill. Un attended object Detection iv. Facial Recognition

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				v. Person counting / Loitering /Tracking
1.4.7.2	The VMS Software, Video Analytics should be a seamless integrated single software Platform.		The functionality needs to be verified by the BOO through Data Sheet.	The VMS Software, Video Analytics must be a seamless integrated single software Platform.
1.4.7.3	Software should be flexible, dynamic, distributed, reactive, real-time, scalable, expandable, redeploy able and shall have following characteristics:- i. Should be deployed on an IP based non-proprietary networks. ii. Leveraging existing infrastructure. iii. Automated policies, workflows and response plan. iv. Control monitor and maintain disparate networks v. Provide a single customized dash board interface which promotes situational awareness with control and monitoring vi. A place where different technology come together to create an efficient and operational requirements.		The functionality needs to be verified by the BOO through Data Sheet.	Software should be flexible, dynamic, distributed, reactive, real-time, scalable, expandable, redeploy able and shall have following characteristics:- i. Should be deployed on an IP based non-proprietary networks. ii. Leveraging existing infrastructure. iii.Automated policies, workflows and response plan. iv.Control monitor and maintain disparate networks v. Provide a single customized dash board interface which promotes situational awareness with control and monitoring vi. A place where different technology come together to create an efficient and operational requirements.
1.4.7.4	**Surveillance Integration Application**: - Real time display of surveillance feeds to the C&C Centre for OPS assessment by commanders. Software should cater for real time monitoring of surveillance sensors, display of surveillance feeds, archiving surveillance feeds, analysis of surveillance feeds and retrieval of feeds at any given time. Software should support display of feed in rugged Laptops/PDA allowing visualization of location surveillance video on map.		The functionality needs to be verified by the BOO through Data Sheet.	**Surveillance Integration Application**: - Real time display of surveillance feeds to the C&C Centre for OPS assessment by commanders. Software should cater for real time monitoring of surveillance sensors, display of surveillance feeds, archiving surveillance feeds, analysis of surveillance feeds and retrieval of feeds at any

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	ii.Video Management Software (VMS) Module :- VMS shall offer centralized management of all devices, servers and users. VMS should manage, store, deliver and support encoding, distributing, managing and achieving. Video feed should allow recipients of the video to brings and play back the expected video without installing separate software on their computer. VMS should provide support for multi casting of video feeds to client work station in order to conserve network resource. **iii.GIS Module:-** Software should have inbuilt integrated GIS module which shall give a multilayer visualization of area of interest with comprehensive view of deployment of sensors and surveillance devices. **iv.Event Handling Module:-** System should be capable of handling various events with a time line view, integration with video/surveillance feed. Event handler shall be capable to provide detailed overview of incident to various concurrent users at a time. **v.Data Visualizations Module :-** System should have functionality of simultaneously display on at least three screen included GIS, VMS and event logging screen.		given time. Software should support display of feed in rugged Laptops/PDA allowing visualization of location surveillance video on map. ii. **Video Management Software (VMS) Module:-** VMS shall offer centralized management of all devices, servers and users. VMS should manage, store, deliver and support encoding, distributing, managing and achieving. Video feed should allow recipients of the video to brings and play back the expected video without installing separate software on their computer. VMS should provide support for multi casting of video feeds to client work station in order to conserve network resource. **iii.GIS Module :-** Software should have inbuilt integrated GIS module which shall give a multilayer visualization of area of interest with comprehensive view of deployment of sensors and surveillance devices. **iv.Event Handling Module :-** System should be capable of handling various events with a time line view, integration with video/surveillance feed. Event handler shall be capable to provide detailed overview of incident to various concurrent users at a time. **v.Data Visulization Module :-** System should have functionality of

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				simultaneously display on at least three screen included GIS, VMS and event logging screen.
1.4.7.5 .	The software should have capability to incorporate the full open API/SDK of platform of any third party system and interface without keeping much dependency on OEM & vendor . It should interface various devices deployed seamlessly. User should be able to save data in GIS format with date and time stamping.		The functionality needs to be verified by the BOO through Data Sheet.	The software must have capability to incorporate the full open API/SDK of platform of any third party system and interface without keeping much dependency on OEM & VENDOR . It must interface various devices deployed seamlessly. User must be able to save data in GIS format with date and time stamping.
1.4.7.6 1.4.7.7	The system should be capable of interfacing with wireless (UHF\VHF) based IP communication network like DMR, Tetra etc. The software shall have feature and compatibility to use Artificial Intelligence (AI)		The functionality needs to be verified by the BOO through Data Sheet.	The system must be capable of interfacing with wireless (UHF\VHF) based IP communication network like DMR, Tetra etc. The software must have feature and compatibility to use Artificial Intelligence (AI).
24. . Monitor 55" (Industrial grade) with wall mount				
24.1	Native resolution (pixels)	**1920X1080 (full HD) or better**	Specification to be verified by the BOO through specification sheet.	Native resolution (pixels) must be as per the requirements mentioned in the QRs.
24.2	Screen type	Non touch	To be checked physically by BOO.	Screen type must be as per the requirements mentioned in the QRs.
24.3	Screen size (diagonal) minimum (cm)	**138 or better**	To be checked physically by BOO.	Screen size (diagonal) minimum (cm) must be as per the requirements mentioned in the QRs.
24.4	Aspect ratio	16:9	Specification to be verified by the BOO through specification sheet.	Aspect ratio must be as per the requirements mentioned in the QRs.
24.5	Duty cycle	24 x 7	Specification to be verified by the BOO through specification sheet.	Duty cycle must be as per the requirements mentioned in the QRs.
24.6	Technology	LED Backlit	Specification to be verified by the BOO through specification sheet.	Technology must be as per the requirements mentioned in the QRs.
24.7	Brightness (Nits) Minimum	**500 or better**	Specification to be verified by the BOO through specification sheet.	Brightness (Nits) minimum must be as per the requirements mentioned in the QRs.

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
24.8	On site OEM Warranty (Year)	**05 years**	Firm has to submit OEM certificate.	On site OEM warranty (year) must be as per the requirements mentioned in the QRs.
24.9	Panel technology	LED	Specification to be verified by the BOO through specification sheet.	Panel technology must be as per the requirements mentioned in the QRs.
24.10	Orientation	Portrait	Specification to be verified by the BOO through specification sheet.	Orientation must be as per the requirements mentioned in the QRs.
24.11	Arrangement of Speakers	Inbuilt	To be checked physically by BOO.	Arrangement of speakers must be as per the requirements mentioned in the QRs.
24.12	Bezel width (mm)	Less than 20 mm	To be checked physically by BOO.	Bezel width (mm) must be as per the requirements mentioned in the QRs.
25. . 3C x 06 & 12 Sq mm CU ARM XLPE Insulated Cable				
25.1	Conductor Dia	06 Square mm or 12 square mm (**To be decided by the user department at the time of indent**)	To be checked physically by BOO.	Conductor dia must be as per requirements mentioned in the QRs.
25.2	Armour	Single layer of Galvanized Steel Round Wire according to IS-3975	Specification to be verified by the BOO through specification sheet.	Armour must be as per requirements mentioned in the QRs.
25.3	Packaging	Steel drum packaging, each having single length cable	To be checked physically by BOO.	Packaging must be as per requirements mentioned in the QRs.
25.4	Cable Type	A2XWY/ 2XWY	Specification to be verified by the BOO through specification sheet.	Cable type must be as per requirements mentioned in the QRs.
25.5	No. of Cores	3	Specification to be verified by the BOO through specification sheet.	Cores of the cable must be 03.
25.6	Voltage Level	1.1kV	To be checked physically by BOO.	Voltage level must be as per requirements mentioned in the QRs.
25.7	System Grounding	Solidly Grounded	Specification to be verified by the BOO through specification sheet.	System grounding must be as per requirements mentioned in the QRs.
25.8	Nominal System voltage	400V ±10%	Specification to be verified by the BOO through specification sheet.	Nominal system voltage must be as per requirements mentioned in the QRs.
25.9	Nominal	50Hz ±3%	Specification to be verified by	Nominal system frequency

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	System Frequency		the BOO through specification sheet.	must be as per requirements mentioned in the QRs.
25.10	Temperature	1)Maximum conductor temp at rated current : 90° C ii) Maximum conductor temp at Short-circuit :250° C	Firm has to submit the OEM certificate.	Temperature must be as per requirements mentioned in the QRs.
25.11	Conductor Material	Electrolytic grade Copper, Purity > 99.97%	Firm has to submit the OEM certificate.	Conductor material must be as per requirements mentioned in the QRs.
25.12	Conductor type	Stranded with number of strands as per IS 8130 (Part-I) 1984	Firm has to submit the OEM certificate.	Conductor type must be as per requirements mentioned in the QRs.
25.13	Insulating material	Cross-Linked-Polyethylene (XLPE) Compound	Firm has to submit the OEM certificate.	Insulating material must be as per requirements mentioned in the QRs.
25.14	Core Identification Strips	Red, Black & Blue/ Green (for neutral)	Firm has to submit the OEM certificate.	Core identification must be as per requirements mentioned in the QRs.
25.15	Material of Inner Sheath	FRLS, PVC ST-2 Compound according to IS-5831	To be checked physically by BOO.	Material of inner sheath must be as per requirements mentioned in the QRs.
25.16	Outer Sheath	FRLS, PVC ST-2 Compound according to IS-5831	To be checked physically by BOO.	Outer sheath must be as per requirements mentioned in the QRs.
26. . Rack Server (2CPU)				
26.1	Form Factor	Rack	To be checked physically by BOO.	Form factor must be as per the requirement mentioned in the QRs.
26.2	Processor Make	Intel	Specification to be verified by BOO through specification sheet.	Processor make must be as per the requirement mentioned in the QRs.
26.3	Maximum number of sockets available on Chipset	2	Specification to be verified by BOO through specification sheet.	Sockets available on chipset must be as per the requirement mentioned in the QRs.
26.4	Maximum number of sockets populated with processor	2	Specification to be verified by BOO through specification sheet.	Sockets populated with processor must be as per the requirement mentioned in the QRs.
26.5	Number of	**24 core**	Specification to be verified by	Core per processor must

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	core per processor		BOO through specification sheet.	be as per the requirement mentioned in the QRs.
26.6	Processor Configuration	**Intel Xeon Gold (2.10 GHz, 24 Cores, 36 MB/150 watt or better**	Specification to be verified by BOO through specification sheet.	Processor configuration must be as per the requirement mentioned in the QRs.
26.7	RAM size (GB)	**512 GB or better**	Specification to be verified by BOO through specification sheet.	RAM size (GB) must be as per the requirement mentioned in the QRs.
26.8	RAM upgraded upto (GB)	**1 TB or Higher**	Specification to be verified by BOO through specification sheet.	RAM upgraded upto (GB) must be as per the requirement mentioned in the QRs.
26.9	Type of Hard Disk Drive	SSD / SAS **In 20:80 ratio**	Specification to be verified by BOO through specification sheet.	Type Hard Disk Drive must be as per the requirement mentioned in the QRs.
26.10	Hard disk drive capacity (GB)	5000 GB or above (**both SSD & SAS Mixed in 20:80 Ratio)**	Specification to be verified by BOO through specification sheet.	Hard disk drive capacity (GB) must be as per the requirement mentioned in the QRs.
26.11	On site OEM warranty	**5 Years**	Specification to be verified by BOO through specification sheet.	On site OEM warranty must be as per the requirement mentioned in the QRs.
26.12	Size	**SMART RACK**	Specification to be verified by BOO through specification sheet.	Size must be as per the requirement mentioned in the QRs.
26.13	**Availability of Co-processor**	**As requirement by the user.**	**Specification to be verified by BOO through specification sheet.**	**Co-processor must be available.**
26.14	Network card supported	1G (2 Nos) and 10G (2 Nos), SFP+ (Two or more)	Specification to be verified by BOO through specification sheet.	Network card supported must be as per the requirement mentioned in the QRs.
26.15	RAID Type	**RAID 5/6**	Specification to be verified by BOO through specification sheet.	RAID type must be as per the requirement mentioned in the QRs.
26.16	USB Port (version 2.0/3.0)	As Per OEM	Specification to be verified by BOO through specification sheet.	USB Port must be as per the requirement mentioned in the QRs.
26.17	FC HBA Dual port card	Yes	Specification to be verified by BOO through specification sheet.	FC HBA dual port card must be as per the requirement mentioned in the QRs.
26.18	FC HBA Dual port card speed	16 Gbps	Specification to be verified by BOO through specification sheet.	FC HBA dual port card speed must be as per the requirement mentioned in

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				the QRs.
26.19	PCI Slot (express Gen 3.0)	8	Specification to be verified by BOO through specification sheet.	PCI slot (express Gen 3.0) must be as per the requirement mentioned in the QRs.
26.20	DIMM SLOTS (Nos)	24	Specification to be verified by BOO through specification sheet.	DIMM slots (Nos) must be as per the requirement mentioned in the QRs.
26.21	Hard Disk (RPM)	**7200 RPM or higher**	Specification to be verified by BOO through specification sheet.	Hard Disk (RPM) must be as per the requirement mentioned in the QRs.
26.22	Total Nos of Port	6 (2 Nos of 1G, 2 Nos of 10 G and 02 Nos SFP)	Specification to be verified by BOO through specification sheet.	Ports must be as per the requirement mentioned in the QRs.
26.23	Redundant Power supply	Yes	Specification to be verified by BOO through specification sheet.	Redundant Power supply must be as per the requirement mentioned in the QRs.
26.24	Redundant Fan	Yes	Specification to be verified by BOO through specification sheet.	Redundant Fan must be as per the requirement mentioned in the QRs.
27.. Computer (Work Station)				
27.1	Processor Make	Intel	To be checked physically by BOO.	The processor must be of Intel.
27.2	Processor configuration	**Intel Xeon W-1350, 6 core, 12 MB cache, 4 GHz or better version**	To be checked physically by BOO.	The processor configuration must be as per the requirement mentioned in the QRs.
27.3	Type of graphics	Discrete	To be checked physically by BOO.	The type of graphics must be as per the requirement mentioned in the QRs.
27.4	**Graphic Card**	**Nvidia Quadro 2200 or RTX4000 Graphics with 8GB**	To be checked physically by BOO.	The graphic card must be as per the requirement mentioned in the QRs.
27.5	RAM	DDR4 Or higher	To be checked physically by BOO.	The RAM must be as per the requirement mentioned in the QRs.
27.6	RAM SIZE (GB)	32GB or higher	To be checked physically by BOO.	The RAM Size (GB) must be as per the requirement mentioned in the QRs.
27.7	RAM expandability (GB)	64 GB or higher	To be checked physically by BOO.	The RAM expandability must be as per the requirement mentioned in the QRs.
27.8	Type of Hard Drive-I	**SATA/SSD**	To be checked physically by BOO.	The type of Hard Drive-I must be as per the

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
				requirement mentioned in the QRs.
27.9	**Nos of hard drives-I**	**As per requirement.**	**To be checked physically by BOO.**	**Number of hard drives-I must be 1 or more**
27.10	Size of hard disk drive-I (GB)	**1 TB or Better**	To be checked physically by BOO.	Size of hard disk drive-I must be as per the requirement mentioned in the QRs.
27.11	Display Types	Non-Touch	To be checked physically by BOO.	The display types must be as per the requirement mentioned in the QRs.
27.12	Display Size (cm)	60.45cm or more	To be checked physically by BOO.	The display size must be as per the requirement mentioned in the QRs.
27.13	Display resolution	2560 x 1440 or higher	To be checked physically by BOO.	The display resolution must be as per the requirement mentioned in the QRs.
27.14	Type of Hard Drive-II	SATA	To be checked physically by BOO.	The type of hard drive-II must be as per the requirement mentioned in the QRs.
27.15	Nos of hard drives-II	1 or more	To be checked physically by BOO.	The Nos of hard drives-II must be as per the requirement mentioned in the QRs.
27.16	Size of hard disk drive-II (GB)	1 TB 7200 rpm SATA	To be checked physically by BOO.	Size of hard disk drive-II must be as per the requirement mentioned in the QRs.
27.17	Form Factor	Desktop	To be checked physically by BOO.	The form factor must be as per the requirement mentioned in the QRs.
27.18	No. of Processor	**01**	To be checked physically by BOO.	As per requirement.
27.19	Display (Antiglare, LED-backit)	Monitor	To be checked physically by BOO.	The display (Antiglare, LED-backit) must be as per the requirement mentioned in the QRs.
27.20	On site OEM warranty	**05 years Warranty**	To be checked physically by BOO.	On site OEM warranty must be as per the requirement.
27.21	Processor Generation	**11th or higher version**	To be checked physically by BOO.	Processor must be of 9th generation
27.22	Networking Interface	Integrated bit N 10/100/1000	To be checked physically by BOO.	Networking interface must be as per the requirement mentioned in the QRs.
27.23	Operating Frequency	**3200 MHz or better**	To be checked physically by BOO.	Operating frequency must be as per the requirement mentioned in the QRs.
27.24	Number of	1 PCIe 3 x4 (x16	To be checked physically by	PCIe slots must be as per

Srl/No.	Parameter	Specification	Trial procedure suggested for Board of Officers	Result expected/ desired
	PCIe slots Gen3(x16)	connector); 2 M.2 PCIe 3 x4; 1 PCIe Gen 3 x16; 2 PCIe 3 x1 (x4 open ended connector)	BOO.	the requirements mentioned in the QRs.

(S L Thaosen),IPS
SDG (Log), BSF

(S C Yadav), DIG
SIW BSF

(Ajeet Kumar), Comdt
SIW BSF

(Hemant Kr Jha),Comdt
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(Dr. M M Gosal), SSO
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(Ankit Adjariya), JAD
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(Maj R K Dutta), TC
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(Anil Nauni), DC
ICT Dte, BSF

(Sudhanshu Kumar), DC
ICT Dte, BSF

(Gaurav Drall), AC
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(Sehdev Yadav), AC
C-R&D, BSF

(Sibu Prasad Bhowmic),
AC/Tele, ITBP

(Insp/RM Ashwani Kumar)
SIW BSF

(SI/GD Naveen Jangid)
CRPF

(SI/RM Sukh Ram),
ICT Dte-BICIT, BSF

(ASI/RM Tokha Ram)
ICT Dte-Eqpt, BSF

(Nb/Sub Hem Bahadur)
Assam Rifle

(Approved/Not approved)

23/6/22

Shri Kuldiep Singh, IPS
Director General
Central Reserve Police Force