अनंतिम टेस्ट गाइड

टीईसी ४८१४१:२०२५

(सं: टीईसी/जीआर/आईटी/एसआरवी-००१/०२ मार्च -२०१८)

TEST GUIDE

TEC 48141:2025

(Supersedes No. TEC/GR/IT/SRV-001/02 Mar-2018)

For

सर्वर

(जीआर सं.: ४८१४०:२०२५)

SERVER

(GR No. TEC 48140:2025)

ISO9001:2015

दूरसंचार अभियांत्रिकी केंद्र
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FOREWORD

Telecommunication Engineering Centre (TEC) is the technical arm of Department of Telecommunications (DOT), Government of India. Its activities include:

- Framing of TEC Standards for Generic Requirements for a Product/Equipment, Standards for Interface Requirements for a Product/Equipment, Standards for Service Requirements & Standard document of TEC for Telecom Products and Services
- Formulation of Essential Requirements (ERs) under Mandatory Testing and Certification of Telecom Equipment (MTCTE)
- Field evaluation of Telecom Products and Systems
- Designation of Conformity Assessment Bodies (CABs)/Testing facilities
- Testing & Certification of Telecom products
- Adoption of Standards
- Support to DoT on technical/technology issues

For the purpose of testing, four Regional Telecom Engineering Centers (RTECs) have been established which are located at New Delhi, Bangalore, Mumbai, and Kolkata.

ABSTRACT

This Test Guide of testing pertains specifies the TSTP conversion to Test Guide of Servers which is intended to be deployed by various service providers to secure their IT/Telecommunication infrastructure.

CONTENTS

A. HISTORY SHEET

Sl. No.	TSTP No.	Equipment/Interface	Issue
1.	TSTP/TEC/GR/IT/SRV-001/01 FEB-14	Generic Requirements for SERVERS	1st issue
2.	TEC/TG/IT/SRV-301/02/MAR-18	Generic Requirements for SERVERS	2nd issue
3.	TEC 48141:2025	Generic Requirements for SERVERS	3rd issue

B. INTRODUCTION

This document enumerates detailed test schedule and procedure for evaluating conformance/functionality/ requirements/ performance of the Servers for deployment in the Indian Telecommunications network as per GR No.: TEC 48140: 2025

C. General information:

Sl.no	General Information	Details *(to be filled by testing team)*	
1	Name and Address of the Applicant		
2	Date of Registration		
3	Name and No. of GR/IR/Applicant' s Spec. against which the approval sought		
4	Details of Equipment		

	Type of Equipment	Model No.	Serial No.
(i)			
(ii)			
5.	Any other relevant Information:-		

D. Testing team: *(to be filled by testing team)*

S.No.	Name	Designation	Organization	Signature
1.				
2.				

E. List of the Test Instruments:

Sno.	Name of the test instrument	Make /Model *(to be filled by testing team)*	Validity of calibration *(to be filled by testing team)*
1.			dd/mm/yyy
2.			
3.			

F. Equipment Configuration Offered: *(to be filled by testing team)*

- **<Equipment/product name> Configuration:**

S.No.	Item	Details	Remarks

Relevant information like No. of cards, ports, slots, interfaces, size etc. may be filled as applicable for the product

- **<Other equipment name> Configuration:**

S.No.	Item	Details	Remarks

Relevant information like No. of cards, ports, slots, interfaces, size etc. may be filled as applicable for the product

G. Equipment/System Manuals: *(to be filled by testing team)*

Availability of Maintenance manuals, Installation manual, Repair manual&User Manual etc. **(Y/N)**

H. Clause-wise Test Type and Test No.: -

Clause No		Clause	Type of Test	Compliance
			Physical Check / Declaration / Document ation / Report from Accredited Test Lab / Functional Verification / Information / Lab Test (Test Reference)	Compli ed / Not Compli ed / Submitted / Not Submitted / Not Applic a ble (Indicat e Annex u re No for Test Results)
1.0		Introduction:	Information	
1.1		The history of servers moves parallel to the history of computer networks. The server is to serve - so technically it means that the specific computer is serving other computers. For example, the server is a computer that facilitates other computers (in network) by making queue of the printing command of several computers at a time or acts like a file server for those applications that are accessed by other computers.	Information	

1.2		A Server is a computer or a device on a network that manages network resources. For example, a file server is a computer and storage device dedicated to storing files. Any user on the network can store files on the server. In a general network environment the following types of servers may be found.	Information	
	a.	Application server- a server dedicated to running certain software applications.	Information	
	b.	Catalog server- a central search point for information across a distributed network	Information	
	c.	Communications server- carrier-grade computing platform for communications networks	Information	
	d.	Compute server- a server intended for intensive (esp. scientific) computations	Information	
	e.	Database server- provides database services to other computer programs or computers	Information	
	f.	File server- provides remote access to files	Information	
	g.	Game server- a server that video game clients connect to in order to play online together	Information	
	h.	Mobile Server or Server on the Go is a server class laptop form factor computer.	Information	
	i.	Name server or DNS	Information	
	j.	Print server- provides printer services	Information	
	k.	Proxy server, acts as an intermediary for requests from clients seeking resources from other servers	Information	
	l.	Sound server, provides multimedia broadcasting, streaming.	Information	
	m	Stand-alone server, a server on a Windows network that neither belongs to nor governs a Windows domain	Information	
	n.	Web server, a server that HTTP clients connect to in order to	Information	

		Send commands and receive responses along with data contents		
1.3		For all ITU–T recommendations and TEC standards referred in this document, the latest release/issue with all associated amendments, addendum and corrigendum shall be applicable.	Information	
1.4		The RFC documents of the IETF are subject to periodic revision. Hence where ever RFC' s are mentioned in this document, the offered product shall meet either the referred RFC or its updated version with all amendments/addendum. Wherever a feature of the RFC is mentioned, product shall comply with the part of the RFC specifying the feature.	Information	
1.5		The interpretation of the clauses of the RFC' s shall be as per RFC 2119.	Information	
2.0		Description of Servers	Information	
2.1		Servers are classified as CISC, RISC and EPIC based servers on the basis of CPU used in the Servers.	Information	
2.1.1		CISC based CPU' s CISC based CPU stands for the CPU' s made with Complex Instruction Set Computing Architecture. A complex instruction set computer (CISC) is a computer where single instructions can execute several low-level operations (such as a load from memory, an arithmetic operation, and a memory store) and/or are capable of multi-step operations or addressing modes within single instructions. To design instruction sets that directly supported high- level programming constructs such as procedure calls, loop control, and complex addressing modes, allowing data structure and array accesses to be combined into single instructions. Instructions are also typically highly encoded in order to further enhance the code density. The compact nature of such instruction sets results in smaller program sizes and fewer main memory accesses, which resulted in savings on the cost of computer memory and disc storage, as well as	Information	

		faster execution. It also means good programming productivity even in assembly language similar to high level languages. However low-end versions of complex architectures could lead to situations where it was possible to improve performance by not using a complex instruction (such as a procedure call or enter instruction), but instead using a sequence of simpler instructions.		

		One reason for this was that programmers sometimes "over-designed" assembly language instructions, i.e. including features which were not possible to implement efficiently on the basic hardware available. This had "side effects", such as the setting of a register or memory location that was perhaps seldom used; which would demand extra process cycles every time, and thus be quite inefficient. Even in balanced high performance designs, highly encoded and high-level instructions could be complicated to decode and execute efficiently within a limited transistor budget. Such architectures therefore required a great deal of work on the part of the processor designer in cases where simpler, but slower, solutions based on decode tables and/or microcode sequencing is not appropriate.		

2.1.2		RISC or EPIC based CPU' s Reduced instruction set computing, or RISC is a CPU design based on the insight that simplified (as opposed to complex) instructions can provide higher performance if this simplicity enables much faster execution of each instruction. A computer based on this strategy is a reduced instruction set computer, also called RISC. The term "reduced" in that phrase was intended to describe the fact that the amount of work any single instruction accomplishes is reduced—at most a single data memory cycle—compared to the "complex instructions" of CISC CPUs that may require dozens of data memory cycles in order to execute a single instruction. In particular, RISC processors typically have separate instructions for I/O and data processing A RISC chip will typically have far fewer transistors dedicated to the core logic which originally allowed designers to increase the size of the register set and increase internal parallelism. Other features that are typically found in RISC architectures are: • Uniform instruction format, using a single word with the opcode in the same bit positions in every instruction, demanding less decoding; • Identical general purpose registers, allowing any register to be used in any context, simplifying compiler design (although normally there are separate floating point registers); • Simple addressing modes, with complex addressing performed via sequences of arithmetic and/or load-store operations; • Few data types in hardware, some CISCs have byte string instructions, or support complex numbers; this is so far unlikely to be found on a RISC. Explicitly parallel instruction computing (EPIC) permits microprocessors to execute software instructions in parallel by using the compiler, rather than complex on-die circuitry, to control parallel instruction execution. This was intended	Information	

		to allow simple performance scaling without resorting to higher clock frequencies.		
2.2		Broadly Servers are classified into the following four types based on their size / modularity.	Information	
	a.	Tower Server	Information	
	b.	Rack Server	Information	
	c.	Blade Server	Information	
	d.	High End Servers	Information	
2.2.1		Tower servers: Tower servers look more like desktops than servers. In general, if requirement is for a lot of servers, tower servers shall not be a choice, because they can take up a lot of space and are difficult to manage physically as they cannot be easily stack one on another. Tower servers require individual monitor, keyboard and mouse or a keyboard, video, mouse (KVM) switch that allows them to be managed with a single set of equipment. Also, cabling can be difficult.	Information	
2.2.2		Rack servers: For a data centre of any reasonable size, rack servers are recommended. Rack servers are sized in Us (which is a single 1.75″ rack unit), rack servers can range from 1U to 5U, 8U, and more. Rack servers are placed inside racks along with other data centre equipment such as backup batteries, switches, and storage arrays. Rack servers make it easier to keep things neat and orderly as most racks include cable management some kind. However, rack servers don' t really simplify the cabling morass since you still need a lot of cabling to make everything work — it' s just neater. Each server had to have dual power cables, keyboard, video, and mouse cables and network cables. Like tower servers, rack servers often need KVM capability in order to be managed, although some organizations simply push a monitor cart around and connect to video and USB ports on the front of the server so that they don' t need to worry about KVM.	Information	

		Rack servers are very expandable; some include 12 or more disks right in the chassis and support for four or more processors, each with multiple cores. In addition, many rack		
		servers support large amounts of RAM, so these devices can be computing powerhouses		
2.2.3		Blade servers: A blade server is a server chassis housing multiple thin, modular electronic circuit boards, known as server blades. Each blade is a server in its own right, often dedicated to a single application. The blades are literally servers on a card, containing processors, memory, integrated network controllers, an optional Fibre Channel host bus adaptor (HBA) and other input/output (IO) ports. The blade servers have no expansion challenges when compared to the tower and rack-based options. The blade chassis has a built-in KVM functionality. Speaking of cabling, a blade environment generally has very much less of it than tower or rack environments since a lot of the connectivity is handled internally. Another point is adding a new server consists of simply sliding it into an available slot in the chassis. There is no need to rack a new server and deal with a bunch of new cabling. This small size makes heat dissipation a challenge. Blade chassis can generate a lot of heat. From a cost perspective, blade servers require some initial infrastructure, such as the chassis, so the upfront cost is often higher than for servers of other types.	Information	

2.2.4		High End Servers High End servers have modular Board or Blade based architecture. They are specially designed for mission critical applications like CDR Billing systems, Enterprise Resource Planning applications etc. The processors used in such scenarios are either RISC or EPIC based ones specially designed to cater for such environments. They do not have internal storage and boots from external storage devices					Information	
2.2.5		Choice of Servers The choice of Server depends upon the amount of data processing required and the type of applications. High End Servers are preferred for mission critical applications like large databases etc.					Information	
3.0		Technical Specifications:					Information	
3.1		Tower Server CISC Type					Information	
3.1.1		Server Hardware					Information	
		Server Parameters		Category I	Category II	Category III	Information	
		Processor					Information	
	1	No. of CPU' s	Minimum	1	1	2	Physical Check	
	2	No. of processor cores per CPU	Minimum	4	8	8	Physical Check	
	3	No. of processor cores per Server	Minimum	4	8	16	Physical Check	
	4	Clock speed	Minimum	2 GHz	2 GHz	2 GHz	Physical Check	
	5	Level 1 cache memory per Core	Minimum (instruction + data)	32 KB	32 KB	32 KB	Declaration	
	6	Level 2 cache memory per Core	Minimum	256 KB	256 KB	256 KB	Declaration	
	7	L3 cache memory per Socket	Minimum	8 MB	16MB	16MB	Declaration	

	Memory					Information	
8	Memory Size	Minimum	16 GB expandable to atleast 64 GB	64GB expandable to atleast 128GB	128GB expandable to atleast 512GB	Physical check & Declaration	
9	Memory Types	Minimum	DDR4			Physical Check	
10	Memory slots	Minimum	4 DIMMS	8 DIMMs	16 DIMMs	Physical Check	
11	FBWC	Minimum			1 GB	Declaration	
12	Operating System		Microsoft Windows Server/ Red Hat Enterprise Linux (RHEL)/ SUSE Linux Enterprise Server (SLES)/ Oracle Enterprise Linux (OEL) / Solaris / Unix or its derivative			Physical Check	
13	Instruction Set	Minimum	64 bit			Physical Check	
	I/O					Information	
14	10/100/100 0 Base T Ethernet Ports	Minimum	1	2	4	Physical Check	
15	10/100 Base T Ethernet port for the management network	Minimum	1	1	1	Physical Check	
16	PCIe 3.0 slot	Minimum	2	2	4	Physical Check	

	17	USB 2.0/3.0 Ports	Minimum	2	2	4	Physical Check	
		Storage					Information	
	18	Drive bays (SAS/SATA)	Minimum	2	2	4	Physical Check	
	19	RAID Support	Minimum	RAID levels: 0, 1	RAID levels: 0, 1	RAID levels: 0, 1 optional RAID 5,6,10	Functional Verification	
	20	Internal storage SAS or SATA	Minimum	300 GB expandable to atleast 1TB	512GB expandable to atleast 2TB	2 TB expandable to atleast 8TB	Physical Check & Declaration	
		Deployment					Information	
	21	Form Factor (fully configured)	Maximum	5U	5U	5U	Physical Check	
3.1.2		Feature Requirements for the Tower Servers					Information	
3.1.2.1		The Processor shall be of the latest generation.					Declaration	
3.1.2		Highest clock speed and largest cache in the proposed cores of the					Declaration	
.2		CPU in the respective category shall be offered.						
3.2		Rack Mount Server CISC Type					Information	

3.2.1		Server Hardware						Information	
		Server Parameters		Category I	Category II	Category III	Category IV	Information	
		Processor						Information	
	1	No. of CPU's	Minimum	1	2	4	8	Physical Check	
	2	No. of processor cores per CPU	Minimum	4	8	8	8	Physical Check	
	3	No. of processor cores per Server	Minimum	4	16	32	64	Physical Check	
	4	Clock speed	Minimum	2 GHz	2GHz	2GHz	2GHz	Physical Check	
	5	Level 1 cache memory per Core	Minimum (instruction + data)	16 KB	80 KB (32 KB Instruction Cache and 48 KB Data Cache)	80 KB (32 KB Instruction Cache and 48 KB Data Cache)	80 KB (32 KB Instruction Cache and 48 KB Data Cache)	Declaration	
	6	Level 2 cache memory per Core	Minimum	256 KB	1.25 MB	1.25 MB	1.25 MB	Declaration	
	7	L3 cache memory per Socket	Minimum	8 MB	16MB	16MB	16MB	Declaration	
		Memory						Information	
	8	Memory Size	Minimum	32 GB Expandable To atleast 128GB	512 GB expandable to atleast 4 TB(per system)	512GB expandable to atleast 4TB	512GB expandable to atleast 4TB	Physical Check & Declaration	
	9	Memory Types	Minimum		DDR4/ DDR5			Physical Check	

	10	Memory slots	Mini mum	8 DIMMs	16 DIMMs	32 DIMMs	64DIMMs	Physical Check	
	11	FBWC	Mini mum		1 GB	2 GB	2 GB	Declaration	
	12	Operating System		Microsoft Windows Server/ Red Hat Enterprise Linux (RHEL)/ SUSE Linux Enterprise Server (SLES)/ Oracle Enterprise Linux (OEL) / Solaris /Unix or its derivative	Microsoft Windows Server/ Ubuntu Linux / Red Hat Enterprise Linux (RHEL)/ SUSE Linux Enterprise Server (SLES)/ Oracle Enterprise Linux (OEL) / Solaris /Unix or its derivative			Physical Check	
	13	Instruction Set	Mini mum	64 bit	64 bit	64 bit	64 bit	Physical Check	

		I/O						Informatio n	
	14	0/100/1000 Ethernet Ports	Mini mum	2	4	4	8	Physical Check	
	15	10G Fiber with virtual nics supports 10G Base T./25G Ethernet Ports	Mini mum	-	4 Nos of 10G/25G Ethernet ports	4 Nos of 10G/25G Ethernet ports	4 Nos of 10G/25G Ethernet ports	Physical Check	

16	10/100Base-T Ethernet port for the management network	Minimum	1	1	1	1	Physical Check	
17	**PCIe 3.0/4.0/5.0 slot**	Minimum	2	3	3	3	Physical Check	
18	USB 2.0/3.0 Ports		2	4	4	2	Physical Check	
	Storage						Information	
19	Drive bays (SAS/SATA/NLSAS/NVMe)	Minimum	2	8 Nos (SATA/NVMe)	8 Nos (SATA/NVMe)	8 Nos (SATA/NVMe)	Physical Check	
20	RAID Support	Minimum	RAID levels: 0, 1	RAID levels : 0, 1 optional RAID 5, 6, 10	RAID levels : 0, 1 optional RAID 5,6,10	RAID levels : 0, 1 optional RAID 5, 6, 10	Functional Verification	

	21	Internal storage	Minimum	512 GB expandable to atleast 1TB	960 GB expandable to at least 2 TB (SATA/NVMe)	960 GB expandable to at least 2 TB (SATA/NVMe)	960 GB expandable to at least 2 TB (SATA/NVMe)	Physical Check & Declaration	
		Deployment						Information	
	22	Form Factor (fully configured)	Maximum	2U	2U	4U	5U	Physical Check	
3.2.2		Server Rack						Information	
		Rack Cabinet Parameters					Category I	Information	
	1	Usable rack units					42 U	Physical Check & Documentation	
	2	Width					19 in	Physical Check & Documentation	
	3	Depth					1000-1200mm	Physical Check & Documentation	
	4	Static/ Dynamic load					800 - 1000 Lbs	Physical Check & Documentation	
	5	Power Distribution Unit (Zero / One RU;	Minimum				2	Physical Check & Documentati	

		single- and three-phase option)					on	
3.2.3		Additional Feature Specifications of Rack Mount CISC Servers:					Information	
	1.	Clustering Software for the offered operating system shall be supported. The Cluster Software for the offered operating system shall support metro/ geo/continental cluster solution. The cluster Software shall be compatible with the offered operating System.					Declaration	
	2.	The Servers shall support IO Accelerators / Flash Cards.					Declaration	
	3	The servers shall be offered with the OEM' s latest version of management software.						
3.3		Rack Mount Server RISC/EPIC Type					Information	
3.3.1		Server Hardware					Information	
		Server Parameters		Category I	Category II	Category III	Information	
		Processor					Information	
	1	No. of CPU' s	Minimum	1	1	2	Physical Check	
	2	No. of processor cores per CPU	Minimum	8	8	8	Physical Check	
	3	No. of processor cores per Server	Minimum	8	16	32	Physical Check	
	4	Clock speed	Minimum	2.4 GHz	2.4 GHz	2.4 GHz	Physical Check	
	5	Level 1 cache memory per Core	Minimum (instruction + data)	32 KB	32 KB	32 KB	Declaration	

	6	Level 2 cache memory per Core	Minimum	128 KB	128 KB	128 KB	Declaration	
	7	L3 cache memory per Socket	Minimum	4MB	8MB	8MB	Declaration	
		Memory					Information	
	8	Memory Size		64GB expandable to atleast 128GB	128GB expandable to atleast 256GB	256GB	Physical Check & Declaration	
	9	Memory Types		DDR4			Physical Check	
	10	Memory slots	Minimum	12 DIMMs	16 DIMMs	32 DIMMs	Physical Check	
	11	Operating System		HP-UX/AIX/Solaris			Physical Check	
	12	Instruction Set		64 bit	64 bit	64 bit	Physical Check	
		I/O					Information	
	13	10/100/1000 Ethernet Ports	Minimum	2	4	4	Physical Check	

	14	10G Fiber with virtual nic support/ 10 G Base T Ethernet Ports	Minimum	-	2	4	Physical Check	
	15	10/100Base-T Ethernet port for the management network		1	1	1	Physical Check	
	16	PCIe 2.0/3.0 slot	Minimum	2	3	6	Physical Check	
	17	USB 2.0 Ports		2	4	6	Physical Check	
		Storage					Information	
	18	Drive bays (SAS/SATA)	Minimum	2	4	6	Physical Check	
	19	RAID Support		RAID levels: 0, 1	RAID levels: 0,1 optional RAID 5, 6, 10	RAID levels: 0, 1 optional RAID 5,	Functional Verification	
	20	Internal storage SAS/SATA/ SSD		512GB expandable to atleast 1TB	512GB expandable to atleast 2TB	1TB expandable to atleast 3TB	Physical Check & Declaration	
		Deployment					Information	

	21	Form Factor (fully configured)	Maximum	2U	2U	4U	Physical Check	
3.3.2		Server Rack Please refer to clause 3.2.2 for details					Tests as per clause 3.2.2	
3.4		Blade Server- CISC Type					Information	
3.4.1		Server Blade					Information	
		Blade Server Parameters		Category I		Category II	Information	
		Processor					Information	
	1	No. of CPU's	Minimum	2		4	Physical Check	
	2	No. of cores per CPU	Minimum	8		8	Physical Check	
	3	No. of processor cores per Server	Minimum	16		32	Physical Check	
	4	Clock speed	Minimum	2GHz		2GHz	Physical Check	
	5	L1 cache memory per Core	Minimum (instruction + data)	32 KB		32 KB	Declaration	
	6	L2 cache memory per Core	Minimum	256 KB		256 KB	Declaration	

	7	L3 cache memory per Socket	Minimum	16 MB	16 MB	Declaration	
		Memory				Information	
	8	Memory Size		64 GB expandable to atleast 256 GB	128 GB expandable to atleast 512 GB	Physical Check & Declaration	
	9	Memory Types		DDR4			
	10	Memory slots	Minimum	12 DIMMS	24 DIMMS	Physical Check	

	11	Operating System		Microsoft Windows Server/ Red Hat Enterprise Linux (RHEL)/ SUSE Linux Enterprise Server (SLES)/ Oracle Enterprise Linux (OEL) / Solaris			
	12	Instruction Set		64 bit	64 bit	Physical Check	
		I/O				Information	
	13	10G Ethernet Ports/ FCoE Ports	Minimum	2	4	Physical Check	
	14	PCIe 2.0/3.0 slots	Minimum	2	2	Physical Check	
		Storage				Information	
	15	Hot-swappable drive bays (SAS-	Minimum	2	2	Physical Check	

		2/SATA-2/NLSAS/SSD)					
	16	Internal storage		512GB expandable to atleast 1TB	512GB expandable to atleast 1TB	Physical Check & Declaration	
	17	RAID Support		RAID levels : 0, 1	RAID levels : 0, 1	Functional Verification	
		Deployment				Information	
	18	Form Factor (fully configured)		Blade	Blade	Physical Check	
3.4.2		Blade Chassis Quantity of the blade chassis shall be determined by the no of blade server required.				Information	
		Blade Chassis Parameters		Category I		Information	
	1	Height		6U - 12U		Physical Check	
	2	Width	Typical	18 in		Physical Check	
	3	No. of Blades per chassis	Minimum	8		Physical Check	
	4	Redundant Cooling modules	Minimum	6		Physical Check	
	5	AC Power		200-240 V		Physical	

					Check	
		Interconnect Interfaces			Information	
	6	SAN Storage Interface (16Gbps)/FCoE	Minimum	4	Physical Check	
	7	10GE Optical LAN Interface/FCoE	Minimum	2	Physical Check	
	8	10/100 Base- T Management Interface	Minimum	1	Physical Check	
3.4.3		Blade Rack			Information	
		Rack Cabinet Parameters		Category I	Information	
	1	Usable rack units	Minimum	42 U	Physical Check	
	2	Height	Typical	75 in.	Physical Check	
	3	Width	Typical	19 in.	Physical Check	
	4	Depth	Typical	38 in.	Physical Check	
	5	Static/ Dynamic load	Maximum	2300 Lbs	Physical Check	
	6	Power Distribution Unit (single and three-phase option)	Minimum	2	Physical Check	
3.4.4		Functional Specifications of Blade Server:			Information	
3.4.4.1		The Rack/Chassis shall have internal/external 10Gbps Ethernet switch with redundancy and shall support the VMready standards.			Declaration	
3.4.4.2		The Ethernet switches shall be of L2 and L3 and shall support the L3 functionalities such as VLAN, FCOE, Routing features etc.			Functional Verification	

3.4.4.3		The blade servers offered are to be run with an uptime of 99%.	Declaration	
3.4.4.4		Clustering Software for the offered operating system shall be supported. The Cluster Software for the offered operating system shall support metro/geocontinental cluster solution. The cluster Software shall be compatible with the offered operating System.	Declaration	
3.4.5		Functional Specifications for Blade Chassis	Information	
3.4.5.1		Rack mountable Chassis to accommodate and Support for half/full height/wide blades in the same enclosure.	Declaration	
3.4.5.2		Shall provide common resources essential for the Blade Servers like Power, System Management, Cabling, Ethernet/ FCoE Management and expansion, external Fiber Channel Storage switching and connectivity.	Declaration	
3.4.5.3		Blade chassis shall support Blade Servers of CISC/RISC/EPIC/any combinations based blades.	Declaration	
3.4.5.4		The blade chassis shall be configured with redundant remote management controllers	Declaration	
3.4.5.5		The blade chassis shall be configured with Hot Swap IP Based KVM functionality for management or KVM Management shall be integrated in remote management controller.	Declaration	
3.4.5.6		Hot Swap and redundant variable speed cooling fans and all fans shall be fully populated.	Declaration	
3.4.5.7		The enclosure shall be populated fully with power supplies of the highest capacity available with the vendor. Power Supplies shall support N+N redu ndancy.	Declaration	
3.4.5.8		The Blade System shall be able to do the dynamic Power Management of the resources as follows	Information	
	a.	Automatically shutdown the servers if required, based on user policies and schedules.	Functional Verification	
	b.	Dynamically optimize the power usage and performance	Declaration	

		based on server workload policy.		
	c.	Cap the power of individual server or a group of servers	Functional Verification	
	d.	Intelligently assign the power to the appropriate server in the pool based on policy settings	Functional Verification	
	e.	Show the actual power usage and actual thermal measurements data of the servers	Functional Verification	
	f.	Show a historical trend of power and temperature and generate comprehensive power reports	Functional Verification	
3.4.5.9		System management tools for configuring the Blade Servers and OS Deployment shall be provided.	Declaration	
3.4.5.10		The system shall provide support for remote console management, Power on/off blades, monitoring the power status, temperature, cooling fans status, I/O status, system diagnostic programs etc. provided through the management software	Functional Verification	
3.4.5.11		The blade chassis shall be configured with cables, connectors and accessories required to connect the Power distribution units to the power supplies	Physical Check	
3.4.5.12		The chassis shall have LED/LCD panel to provide power-on, location, information and system error conditions.	Physical Check	
		Necessary hardware management console software is to be supplied.	Declaration	
3.4.5.13		The chassis with all of the enclosures are to be run with an uptime of 99%	Declaration	
3.5		Blade Server- RISC/EPIC Type	Heading	
3.5.1		Server Blade	Information	

		Blade Server Parameters		Category I	Category II	Information	
		Processor				Information	
	1	No. of CPU	Minimum	1	2	Physical Check	
	2	No. of cores per CPU	Minimum	8	8	Physical Check	
	3	No. of processor cores per blade	Minimum	8	16	Physical Check	
	4	Clock speed	Minimum	2.4 GHz	2.4 GHz	Physical Check	
	5	L1 cache memory per Core	Minimum (instruction + data)	32KB	32KB	Declaration	
	6	L2 cache memory per Core	Minimum	128KB	128KB	Declaration	
	7	L3 cache memory per Socket	Minimum	4MB	8MB	Declaration	
		Memory				Information	
	8	Memory Size	Minimum	128GB expandable to atleast 256GB	256GB expandable to atleast 384GB	Physical Check & Declaration	
	9	Memory Types	Minimum	DDR3		Physical Check	
	10	Memory DIMM slots	Minimum	8	16	Physical Check	
	11	Operating System		HP-UX/AIX/Solaris			
	12	Instruction Set	Minimum	64 bit			
		I/O				Information	
	13	10G Optical Ethernet Ports	Minimum	2	2	Physical Check	
	14	PCIe				Physical	

		2.0/3.0 Slots				Check	
		Storage					
	15	SAS-2/SATA-2/SSD drive bays	Minimum	2	2	Physical Check	
	16	Internal storage	Minimum	512GB expandable to atleast 1TB	512GB expandable to atleast 1TB	Physical Check & Declaration	
	17	RAID	Minimum	OS RAID 0,1	OS RAID 0,1	Functional Verification	
		Deployment					

	18	Form Factor (fully configured)		Blade	Blade	Physical Check	
3.5.2		Blade Chassis Please refer to clause 3.4.2 for details				Tests as per clause 3.4.2	
3.5.3		Blade Rack Please refer to clause 3.4.3 for details				Tests as per clause 3.4.3	
3.5.4		Functional Specifications of RISC/EPIC Blade Server				Information	
3.5.4.1		The Rack/Chassis shall have internal/external10Gbps Ethernet switch with redundancy and shall support the VMready standards.				Declaration	
3.5.4.2		The Ethernet switches shall be of L2/L3 and shall supports the L3 functionalities such as VLAN, FCOE, OSPF etc.				Functional Verification	
3.5.4.3		The blade servers offered are to be run with an uptime of 99%.				Declaration	
3.5.4.4		The Solution shall offer clustering software as part of the OS				Declaration	
3.5.4.5		The Solution shall offer capacity planning tool software as part of the OS				Declaration	
3.5.4.6		Real time performance management tool is mandatory				Declaration	
3.5.5		Additional Functional Specifications for Blade Chassis: Please refer to clause 3.4.5 for details				Tests as per clause 3.4.5	
3.6		High-end Server- RISC/EPIC Type				Information	
3.6.1		Server Hardware				Information	

		Server Parameters		Category I	ategory II	Category III	Category IV	Information	
		Processor						Information	
	1	No. of CPU Positions	Minimum	4	8	16	32	Physical Check	
	2	No. of cores per CPU	Minimum	8	8	8	8	Physical Check	
	3	Total processor cores	Minimum	32 expandable to 64	64 expandable to 128	128 expand able to atleast 256	256 expandable to atleast 512	Physical Check	
	4	Clock speed	Minimum	2.5 GHz	2.5 GHz	2.5 GHz	2.5 GHz	Physical Check	
	5	Level 1 cache memory per Core	Minimum (instruction + data)	32 KB	32 KB	32 KB	32 KB	Declaration	
	6	Level 2 cache memory per Core	Minimum	128 KB	128 KB	128 KB	128 KB	Declaration	
	7	L3 cache memory per Socket	Minimum	24MB	24MB	24MB	24MB	Declaration	
		Memory						Information	

	8	Memory Size	Minimum	1TB expandab le to atleast 4TB	2TB expandable to atleast 4TB	2TB expandable to atleast 4TB	2TB expandabl e to atleast 8TB	Physical Check & Declaration	
	9	Memory Types	Minimum	DDR3				Physical Check	
	10	Memory DIMM slots	Minimum	32	64	64	64	Physical Check	
	11	Operating System		HP-UX/ Oracle Solaris/ IBM AIX					
	12	Instruction Set	Minimum	64 bit					
		I/O						Information	
	13	10GE Ethernet Ports	Minimum	8	8	8	16	Physical Check	
	14	PCIe 2.0/3.0 bus	Minimum	8	16	16	24	Physical Check	
3.6.2		Server Rack							
		Rack Cabinet Parameters					Category I		
	1	Usable rack units		Minimum			42 U	Physical Check	
	2	Height		Typical			75 in.	Physical Check	
	3	Width		Typical			19 in.	Physical Check	
	4	Depth		Typical			38 in.	Physical Check	
	5	Redundant Cooling modules		Minimum			10	Physical Check	
	6	AC Power					200-240 V	Physical Check	
	7	SAN Storage Interface (8Gbps)		Minimum			4	Physical Check	
	8	10GE Optical LAN Interface		Minimum			2	Physical Check	

	9	10/100 Management Ethernet Interface	Minimum	1	Physical Check	
	10	Static/ Dynamic load	Maximum	2300 Lbs	Physical Check	
	11	Power Distribution Unit (single and three-phase option)	Minimum	2	Physical Check	

3.6.3		Features to be supported for the High-end Server:	Information	
3.6.3.1		The boot shall be through internal /external SAN Storage	Functional Verification	
3.6.3.2		The system shall interface with an External Storage system as described in SAN Storage to be connected for database connectivity.	Functional Verification	
3.6.3.3		Each server shall be configured with highest redundancy components possible in the Server portfolio.	Declaration	
3.6.3.4		The server shall be configured with full redundant PCI Express cards. All adapters shall be PCIe only in external I/O drawers.	Declaration	
3.6.3.5		Power supply shall be hot-swappable and shall be replaceable while the system is running.	Declaration	
3.6.3.6		The virtualisation software shall not have any restriction on adding/removing cores, memory, disks and I/O resources. The virtualisation software shall be licenses to create any number of virtual partitions limited only with the hardware.	Declaration	
3.6.3.7		Operating System:	Information	
	a.	Partitions shall be configured with full core with capability to create sub-CPU partitioning also.	Functional Verification	
	b.	Shall have inbuilt logical volume management capability with the volume manager.	Functional Verification	

	c.	The server shall be configured with 64-bit OEM UNIX/ or its derivatives Operating System with unlimited license.	Functional Verification and Declaration for unlimited License.	
	d.	The vendor shall guarantee the O/S backward compatibility with applications.	Declaration	

	e.	Any configuration change in one partition shall not affect any other partition unless desired.	Declaration	
	f.	An error in one partition shall not bring the entire system or other partitions down.	Declaration	
	g.	Each partition shall be upgradeable separately and independently without affecting other partitions.	Declaration	
	h.	Latest version of 64-bit OEM Unix Operating System with latest patch level must be provided.	Declaration	
	i.	It shall include: Volume Management & OS based File System	Functional Verification	
	j.	The Unix Operating Systems shall be licensed to support unlimited users. Future Patches and upgrades shall also be licensed.	Declaration	
	k.	Partition management software having dynamic configuration feature with GUI / Web interface	Functional Verification	
	l.	Management Consoles for the same shall be provided	Functional Verification	
3.6.3.8		The system shall support PCI error handling	Functional Verification	
3.6.3.9		The system shall support Redundant, hot-swap/pluggable I/O interconnect modules.	Declaration	
3.6.3.10		Server main components shall be Fault-tolerant.	Declaration	
3.6.3.11		The system shall support Redundant AC input.	Declaration	
3.6.3.12		The system shall support Dynamic power management	Declaration	
3.6.3.13		Server shall be populated with full capabilities for highest redundancy	Declaration	
3.7		General Features to be supported for the Rack Mount / Blade / High End Servers	Information	
3.7.1		The Processor generation will be specified by the purchaser as mentioned in Guidelines for the Tendering Authority clause	Declaration	

		no. 11.1. .		
3.7.2		Latest and better clock speed and largest cache CPU available shall be offered.	Declaration	
3.7.3		Each server shall be populated and configured with minimum supported CPUs. The term "CPU" here refers to one physical socket which may be containing minimum cores as specified in the different categories.	Functional Verification	
3.7.4		All servers shall be provided with the capability of being partitioned through virtualisation; each partition shall have its own operating system instance, host name and IP address	Functional Verification	
3.7.5		Each partition using virtualisation shall be able to run same or different versions of OS kernel, patch levels, etc. independently. Any configuration change in one partition shall not affect any other partition	Functional Verification with one OS Kernel and Declaration for rest of kernels.	
3.7.6		Each partition shall have the capability to start-up and shutdown independently without affecting any other partition on the same server	Declaration	
3.7.7		The OS of each partition shall be upgradeable separately and independently without affecting the other partitions.	Declaration	
3.7.8		The server shall support necessary virtualization software to create partitions and manage these partitions.	Functional Verification	
3.7.9		Necessary virtualization, cluster configuration and management software are to be provided with unlimited users.	Declaration	
3.7.10		The virtualisation software shall not have any restriction on adding/removing cores, memory, disks and I/O resources.	Declaration	

		The virtualisation software shall be licenses to create any number of virtual partitions limited only with the hardware.	Declaration	
3.7.11		Operating system/Virtualisation software offered shall include the following features:	Information	
	a.	Virtualisation functionality to allow the creation of multiple shared processor partitions within the server	Functional Verification	
	b.	Workload management for simplification and enhancing the capabilities for managing a system's workload	Functional Verification	
	c.	Patch management system for identifying, acquiring, installing, and verifying patches	Functional Verification	
	d.	Dynamic multipath I/O for fiber channel and SCSI I/O paths for disk and tape devices	Functional Verification	
3.7.12		The Server shall support memory sparing/mirroring and lockstep technology.	Declaration	
3.7.13		The server shall support Agent less management	Declaration	
3.7.14		The server shall support out of band Management	Declaration	
3.8		Server Performance Requirements applicable to Blade Servers and High End Servers	Information	
3.8.1		The Server shall provide unified performance state view in single console, integrate network, server and performance management.	Functional Verification	
3.8.2		The Server shall support TCP based server agents to ensure availability and performance for target server nodes and deliver scalable, real-time management of critical systems.	Functional Verification	
3.8.3		The Server shall monitor various operating system parameters such as processor, memory, files, processes, file system, etc. using agents on the servers to be monitored	Functional Verification	

3.8.4		It shall be possible to configure the operating system monitoring agents to monitor based on user-defined thresholds for warning/critical states	Functional Verification	
3.8.5		The server shall be capability to be integrated with network performance management system and support operating system monitoring	Functional Verification	
3.8.6		The Server shall manage the following parameters	Information	
	a.	Processors: Each processor in the system shall be monitored for CPU utilization. Current utilization is compared with user-defined warning and critical thresholds.	Functional Verification	
	b.	File Systems: Each file system shall be monitored for the amount of file system space used, which is compared with user-defined warning and critical thresholds	Functional Verification	
	c.	Log Files: Logs shall be monitored to detect faults in the operating system, the communication sub-system, and the applications. System agents also analyse the log files residing on the host for specified string patterns	Functional Verification	
	d.	System Processes: System agents shall provide real-time collection of data from all system processes. It identifies whether or not an important process has stopped unexpectedly. It can also automatically restart Critical processes	Functional Verification	
	e.	Memory: System agents shall monitor memory utilization and available swap space and shall raise an alarm in event of threshold violation	Functional Verification	
3.8.7		The Server shall provide automated management to detect, isolate and resolve problems autonomously.	Functional Verification	
3.8.8		The Server shall provide monitoring wherein it will track critical status such as	Information	
	a.	CPU utilization	Functional Verification	
	b.	Memory capacity	Functional Verification	
	c.	File system space	Functional Verification	

3.9		Green Server Requirements	Information	
3.9.1		Power Supply Efficiency The efficiency and power factor of the Power Supplies shall be as per Energy Star or Environment Protection Agency [EPA] Gold standards	Declaration	
3.9.2		The Power Supply shall meet the Energy Star or Environment Protection Agency [EPA] Gold Requirement for idle state efficiency	Declaration	
3.9.3		CPU Power Saving Technology: The CPU shall support speed throttling and power saving technology (DVFS – Dynamic Voltage and Frequency Scaling) that reduces the processor's clock rate and voltage when the processor is idle. The aim is to minimize overall power consumption and lower heat generation, allowing for slower (and quieter) cooling fan operation	Declaration	
3.9.4		Operating System features for Power Saving	Information	
	a.	The operating systems shall take advantage of hardware features to deliver optimal power efficiency for any given workload running on the server.	Declaration	
	b.	The OS shall continuously alter the power states of the processors in the system in response to the utilization level of the workload. This ensures that processor power usage maps to the needs of the workload, with minimal impact on performance.	Declaration	
	c.	The Operating Systems shall achieve additional power savings by combining processor power state control with features that consolidates work onto a smaller number of processor cores when workload utilization is low. This feature places unused processor cores into a deep sleep state, effectively scaling the number of processor cores in active use.	Declaration	
	d.	The OS shall also support features which shall extend the time that processor cores stay in deep sleep states by avoiding waking cores unnecessarily.	Declaration	
	e.	The System shall support automatic fan speed management	Declaration	
	f.	The System shall support Power Saving Measures in High End / Blade Server Configurations such that the Blades/Boards are switched ON/OFF during low workload periods.	Declaration	

3.9.5		Measurement of Power Parameters	Information	
	a.	The supervisory power management system shall be enabled by default.	Functional Verification	
	b.	The system shall have the capability to measure real-time power use, Processor utilization, Temperature etc.	Functional Verification	
3.10		IPv6 Requirements: The supplied operating system of the Servers shall meet the IPv6 requirements as per RFC8200, RFC 4861, RFC 4862, RFC8201 and RFC 4443.	Refer Lab Test 1	
3.11		Synchronisation.	Functional Verification	
	a.	The Server shall Support Network Time Protocol (NTPv4 as per RFC 5905) for synchronizing with a central NTP server.		
	b.	The Server shall support Precision Time Protocol (PTP) as per IEEE1588-2008 for synchronizing with a central PTP server. This is optional. However exact requirement will be specified by the purchaser as mentioned in Guidelines for the Tendering Authority clause no. 11.1.		
4.0		Interconnectivity and Inter-Operability Requirements The interconnectivity interfaces for the Servers shall be as per the following Standards.	Information	
4.1		General	Information	
	1.	The Server shall be based on commercially available pluggable SFP optics for all optical interfaces and Pluggable SFP for Electrical Interfaces.	Physical Check	
	2.	The Server shall support full duplex capabilities on all Ethernet ports	Functional Verification	
	3.	All Ethernet interfaces shall be based on IEEE 802.3 Standards	Information	

	4.	Physical Interface: The instrument shall support atleast the following physical interfaces [The exact requirement of the interfaces shall be specified by the purchaser] i. 10/100 Ethernet interface ii. 10/100/1000 Ethernet auto sensing as per IEEE 802.3 full duplex iii. 1G Optical interface iv. 10G Optical interface v. 10G electrical interface vi. 16 GE fiber channel interface towards SAN vii. 32 GE fibre channel interface towards SAN viii. 25 GE Optical Ethernet Interface	Information	
4.2		10/100 Ethernet Interface 10/100 Base-T, 100mt, autosensing	Refer Lab Test 2 & 3	
4.3		10/100/1000 Ethernet Interface 10/100/1000 Base-T, 100mt, autosensing	Refer Lab Test 2 & 3	
4.4		1GE Optical Interface	Information	
	1.	Wavelength: 850 nm multi-mode	Refer Lab Test 4,5 & 6	
	2.	Distance coverage: 500 m	Refer Lab Test 4,5 & 6	
4.5		10GE Optical Interface	Information	
	1	Wavelength: 850 nm multi-mode	Refer Lab Test 4,5 & 6	

	2	Distance coverage: 200 m	Refer Lab Test 4,5 & 6	
	3	The interface shall be based on SFP+	Physical Check	
4.6		10 GE Electrical Interface	Refer Lab Test 2 & 3	
4.7		16GE Fiber Channel Interface towards SAN	Information	
	1.	Wavelength: 850 nm multi-mode	Refer Lab Test 4,5 & 6	
	2.	Distance coverage: 100 m	Refer Lab Test 4,5 & 6	
	3.	Fiber Channel Interface shall be as per standards of T11 Technical Committee of the International Committee for Information Technology Standards (INCITS), an American National Standards Institute (ANSI)- accredited standards committee.	Declaration	
5.0		Qualitative Requirements (QR): The system shall meet the following qualitative requirements:	Information	
	5.1	The manufacturer shall furnish the MTBF value. Minimum value of MTBF shall be specified by the purchaser. The calculations shall be based on the guidelines given in either QA document No. QM-115 {January 1997} "Reliability Methods and Predictions" or any other international standards.	Declaration	
	5.2	The equipment shall be manufactured in accordance with international quality management system ISO 9001:2015 or any other equivalent ISO certificate for which the manufacturer should be duly accredited. A quality plan describing the quality assurance system followed by the manufacturer would be required to be submitted.	Declaration	

	5.3	The equipment shall conform to the requirements for Environment specified in TEC QA standards QM-333 {Issue-March, 2010} (TEC 14016:2010) "Standard for Environmental testing of Telecommunication Equipment" or any other equivalent international standard, for operation, transportation and storage. The applicable environmental category A or B to be decided by the purchaser based on the use case.	Declaration	
6.0		EMI/EMC Requirements The equipment shall conform to the EMC requirements as per the following standards and limits indicated therein. A test certificate and test report from accredited test lab shall be furnished from a test agency.	Information	
	a.	Conducted and radiated emission(applicable to telecom equipment): Name of EMC Standard: "CISPR 32 (2015) with amendments - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment". Limits:- i) To comply with Class B of CISPR 32 (2015) with amendments for indoor deployments and Class A of CISPR 32 (2015) with amendments with amendments for outdoor deployments.	Report from Accredited Test Lab	
	b.	Immunity to Electrostatic discharge: Name of EMC Standard: IEC 61000-4-2 {2008) "Testing and measurement techniques of Electrostatic discharge immunity test". Limits:- i) Contact discharge level 2 {± 4 kV} or higher voltage; ii) Air discharge level 3 {± 8 kV} or higher voltage;	Report from Accredited Test Lab	

	c.	Immunity to radiated RF: Name of EMC Standard: IEC 61000-4-3 (2010) "Testing and measurement techniques- Radiated RF Electromagnetic Field Immunity test". Limits:- For Telecom Equipment and Telecom Terminal Equipment without Voice interface (s) Under Test level 2 {Test field strength of 3 V/m} for general purposes in frequency range 80MHz to 1000 MHz and for protection against digital radio telephones and other RF devices in frequency ranges 800 MHz to 960 MHz and 1.4 GHz to 6.0 GHz.	Report from Accredited Test Lab	
	d.	Immunity to fast transients (burst): Name of EMC Standard: IEC 61000-4-4 {2012) techniques of electrical fast transients/burst immunity test". "Testing and measurement Limits:- Test Level 2 i.e. a) 1 kV for AC/DC power lines; b) 0. 5 kV for signal / control / data / telecom lines;	Report from Accredited Test Lab	
	e.	Immunity to surges: Name of EMC Standard: IEC 61000-4-5 (2014) "Testing & Measurement techniques for Surge immunity test". Limits:- i) For mains power input ports : (a) 2 kV peak open circuit voltage for line to ground coupling (b) 1 kV peak open circuit voltage for line to line coupling ii) For telecom ports : (a) 2kV peak open circuit voltage for line to ground (b) 2KV peak open circuit voltage for line to line coupling.	Report from Accredited Test Lab	

	f.	Immunity to conducted disturbance induced by Radio frequency fields: Name of EMC Standard: IEC 61000-4-6 (2013) with amendments) "Testing & measurement techniques-Immunity to conducted disturbances induced by radio- frequency fields" . Limits:- Under the test level 2 {3 V r.m.s.} in the frequency range 150 kHz-80 MHz for AC / DC lines and Signal /Control/telecom lines.	Report from Accredited Test Lab	
	g.	Immunity to voltage dips & short interruptions (applicable to only ac mains power input ports, if any): Name of EMC Standard: IEC 61000-4-11 (2004) "Testing & measurement techniques- voltage dips, short interruptions and voltage variations immunity tests" . Limits:- i) a voltage dip corresponding to a reduction of the supply voltage of 30% for 500ms (i.e. 70 % supply voltage for 500 ms) ii) a voltage dip corresponding to a reduction of the supply voltage of 60% for 200ms; (i.e.40% supply voltage for 200ms) iii) a voltage interruption corresponding to a reduction of supply voltage of > 95% for 5s. iv) a voltage interruption corresponding to a reduction of supply voltage of >95% for 10s.	Report from Accredited Test Lab	

	h.	Immunity to voltage dips & short interruptions (applicable to only DC power input ports, if any): Name of EMC Standard: IEC 61000-4-29:2000: Electromagnetic compatibility (EMC)- Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests. Limits:- i. Voltage Interruption with 0% of supply for 10ms. Applicable Performance Criteria shall be B. ii. Voltage Interruption with 0% of supply for 30ms, 100ms, 300ms and 1000ms. Applicable Performance Criteria shall be C. iii. Voltage dip corresponding to 40% & 70% of supply for 10ms, 30 ms. Applicable Performance Criteria shall be B. iv. Voltage dip corresponding to 40% & 70% of supply for 100ms, 300 ms and 1000ms. Applicable Performance Criteria shall be C. v. Voltage variations corresponding to 80% and 120%of supply for 100 ms to10s as per Table 1c of IEC 61000-4-29. Applicable Performance Criteria shall be B.	Report from Accredited Test Lab	
		Note: - For checking compliance with the above EMC requirements, the method of measurements shall be in accordance with TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16 (TEC 11016:2016) and the referenced base standards i.e. IEC and CISPR standards and the references mentioned therein unless otherwise specified	Information	

		specifically. Alternatively, corresponding relevant Euro Norms of the above IEC/CISPR standards are also acceptable subject to the condition that frequency range and test level are met as per above mentioned sub clauses (a) to (h) and TEC Standard TEC/SD/DD/EMC-221/05/OCT-16 (TEC 11016:2016). The details of IEC/CISPR and their corresponding Euro Norms are as follows: IEC/CISPR Euro Norm CISPR 11 EN 55011 CISPR 32 EN55032 IEC 61000-4-2 EN 61000-4-2 IEC 61000-4-3 EN 61000-4-3 IEC 61000-4-4 EN 61000-4-4 IEC 61000-4-5 EN 61000-4-5 IEC 61000-4-6 EN 61000-4-6 IEC 61000-4-11 EN 61000-4-11 IEC 61000-4-29 EN 61000-4-29		
7.0		Safety Requirements:	Information	
	7.1	The equipment shall conform to relevant safety requirements as per IS/IEC 62368-1:2018 or Latest as prescribed under Table no. 1 of the TEC document 'SAFETY REQUIREMENTS OF TELECOMMUNICATION EQUIPMENT" : TEC10009: 2024. The manufacturer/supplier shall submit a certificate in respect of compliance to these requirements.	Declaration	

8.0		Security Requirements	Information	
8.1		Physical Security	Information	
	a.	There shall be lock and Key arrangement for the Server Rack.	Physical Check	
8.2		Security of the Operating System	Information	
	a.	The OEM shall identify the vulnerabilities periodically using standard tools. No proprietary tools shall be used.	Declaration	
	b.	The OEM shall supply and assist in the installation of patches in time for all the known vulnerabilities.	Declaration	
	c.	It shall be possible to remove unnecessary services, applications, and network protocols such as File and printer sharing services, Wireless networking services, Remote control and remote access programs, Directory services, Web servers and services, Email services (e.g., SMTP), Language compilers and libraries, System development tools, System and network management tools and utilities, including Simple Network Management Protocol (SNMP) etc.	Functional Verification	
	d.	It shall be possible to configure OS user authentication such as Remove or Disable Unneeded Default Accounts, Disable Non- Interactive Accounts, Create the User Groups, Create the User Accounts, Configure Automated Time Synchronization, and Check the Organization' s Password Policy, Configure Computers to Prevent Password Guessing.	Functional Verification	
	e.	It shall be possible to configure resource controls appropriately.	Functional Verification	
	f.	The Server shall not permit remote monitoring from outside the network.	Functional Verification	
8.3		Security of the System Software	Information	
8.3.1		It shall be possible to secure the system software in the following way:	Information	
	a.	Install the server software either on a dedicated host or on a dedicated guest OS if virtualization is being employed.	Declaration	

	b.	Apply any patches or upgrades to correct for known vulnerabilities in the server software.	Declaration	
	c.	Create a dedicated physical disk or logical partition (separate from OS and server application) for server data, if applicable.	Declaration	
	d.	Remove or disable all services installed by the server application but not required (e.g., gopher, FTP, HTTP, remote administration).	Functional Verification	
	e.	Remove or disable all unneeded default user accounts created by the server installation.	Functional Verification	
	f.	Remove all manufacturers' documentation from the server.	Functional Verification	
	g.	Remove all example or test files from the server, including sample content, scripts, and executable code.	Functional Verification	
	h.	Remove all unneeded compilers.	Functional Verification	
	i.	Apply the appropriate security template or hardening script to the server.	Declaration	
	j.	For external-facing servers, reconfigure service banners not to report the server and OS type and version, if possible.	Declaration	
	k.	Configure warning banners for all services that support such banners.	Declaration	
	l.	Configure each network service to listen for client connections on only the necessary TCP and UDP ports, if possible.	Declaration	
	m.	Limit the access of the server application to a subset of computational resources	Functional Verification	
	n.	Limit the access of users through additional access controls enforced by the server, where more detailed levels of access control are required.	Declaration	
8.3.2		Typical files to which access shall be controlled are as follows	Information	
	a.	Application software and configuration files	Functional Verification	
	b.	Files related directly to security mechanisms	Functional Verification	

	i.	Password hash files and other files used in authentication	Functional Verification	
	ii.	Files containing authorization information used in controlling access	Functional Verification	
	iii.	Cryptographic key material used in confidentiality, integrity, and non-repudiation services	Functional Verification	
	c.	Server log and system audit files	Functional Verification	
	d.	System software and configuration files	Functional Verification	
	e.	Server content files	Functional Verification	
8.3.3		Server host OS access controls shall be used to enforce the following:	Information	
	a.	Service processes are configured to run as a user with a strictly limited set of privileges (i.e., not running as root, administrator, or equivalent).	Declaration	
	b.	Service processes can only write to server content files and directories if necessary.	Declaration	
	c.	Temporary files created by the server software are restricted to a specified and appropriately protected subdirectory (if possible). Access to these temporary files is limited to the server processes that created the files (if possible).	Declaration	
8.4		Maintaining Security of the System	Information	
8.4.1		Logging	Information	
	1.	Logging is a cornerstone of a sound security posture. Capturing the correct data in the logs and then monitoring those logs closely is vital. Procedures and tools need to be in place to process and analyze the log files and to review alert notifications.	Information	
	2.	Server logs shall provide—	Information	
	a.	Alerts to suspicious activities that require further investigation	Functional Verification	
	b.	Tracking of an attacker' s activities	Functional Verification	
	c.	Assistance in the recovery of the server	Functional Verification	

	d.	Assistance in post-event investigation	Functional Verification	
	e.	Required information for legal proceedings.	Functional Verification	
	3.	All servers shall use time synchronization technologies, such as the Network Time Protocol (NTP), to keep their internal clocks synchronized with an accurate time source. This provides accurate timestamps for logs	Functional Verification	
	4.	It shall be possible to back up and archive the Log files regularly.	Functional Verification	
	5.	Many servers receive significant amounts of traffic, and the log files quickly become voluminous. Automated log analysis tools shall be supplied to ease the burden on server administrators. These tools analyze the entries in the server log files and identify suspicious and unusual activity.	Functional Verification	
8.4.2		Server Backup	Information	
	a.	Server shall support RAID feature	Functional Verification	
	b.	The server shall support full, incremental, and differential backup.	Functional Verification	
	c.	Full backups include the OS, applications, and data stored on the server (i.e., an image of every piece of data stored on the server hard drives).	Information	
	d.	Incremental backups reduce the impact of backups by backing up only data that has changed since the previous backup (either full or incremental).	Information	
	e.	Differential backups reduce the number of backup sets that must be accessed to restore a configuration by backing up all changed data since the last full backup.	Information	

8.5		The Server shall comply to the security guidelines issued by DoT vide no. 10-54/2010-CS-III (ILD) dt.31/05/2011 and subsequent amendments if any. Approval against this GR shall not be construed as an authorization evade surreptitiously, regulations including toll-bypass concerning the telecom services. Functioning or intended use of the SERVER shall conform to the prevailing license conditions/laws/regulation/instructions of Govt. of India.	Declaration	
9.0		Other Mandatory Requirements	Information	
9.1		Engineering Requirements: The system shall meet the following engineering requirements:	Information	
	a.	The equipment shall be fully solid state and adopt state of the art technology.	Declaration	
	b.	The equipment shall be compact, composite construction and light weight. The actual dimensions and weight of the equipment shall be furnished by the manufacturers.	Declaration	
	c.	All connectors shall be reliable, low loss and standard type so as to ensure failure free operations over long operations	Declaration	
	d.	The equipment shall have adequate cooling arrangements, if required.	Declaration	
	e.	Each sub-assembly shall be clearly marked with schematic reference to show its function, so that it is identifiable from the layout diagram in the handbook.	Physical Check	
	f.	Each terminal block and individual tags shall be numbered Suitably with clear identification code.	Physical Check	
	g.	All controls, switches, indicators etc. shall be clearly marked to show their circuit diagrams and functions.	Physical Check	
9.2		Operational Requirement (OR): The system shall meet the following maintenance & operational requirements:	Information	
	a.	The equipment shall be designed for continuous operation.	Declaration	
	b.	The equipment shall be able to perform satisfactorily without any degradation at an altitude upto 3000 meters above mean sea level.	Declaration	
	c.	Suitable visual indications shall be provided to indicate the healthy and unhealthy conditions.	Declaration	

	d.	The design of the equipment shall not allow plugging of a module in the wrong slot or upside down.	Declaration	
	e.	The removal or addition of any cards shall not disrupt traffic on other cards in case of card type line driver, except in case of Rack Server, for which this clause is not applicable.	Declaration	
	f.	Special tools required for wiring shall be provided along with the equipment.	Declaration	
	g.	In the event of a bug found in the software, the Manufacturer shall provide patches and firmware replacement if involved, free of cost. Compatibility of the existing hardware shall be maintained with future software/firmware.	Declaration	
	h.	In the event of a full system failure, a trace area shall be maintained in non-volatile memory for analysis and problem resolution.	Declaration	
	i.	A power down condition shall not cause loss of connection configuration data storage.	Declaration	
	j.	The system hardware / software shall not pose any problem, due to changes in date and time caused by events such as changeover of millennium / century, leap year etc., in the normal functioning of the system.	Declaration	
	k.	Wherever, the standardized documents like ITU-T, IETF, QA, TEC etc. documents are referred, the latest issue and number with the amendments shall be applicable.	Declaration	
	l.	Power Supply:	Information	
		i) The equipment shall be able to function over the range specified in the respective chapters, without any degradation in performance.	Declaration	
		ii) The equipment shall be protected in case of voltage variation beyond the range specified and also against input reverse polarity.	Declaration	
		iii) The derived DC voltages shall have protection against short circuit and overload.	Declaration	
9.3		Documentation, Installation and Maintenance:	Information	

9.3.1		Documentation: This chapter describes the general requirements for documentation to be provided for Servers. All technical documents shall be in English language both in CD-ROM and in hard copy.	Documentation	
9.3.1		The documents shall comprise of:	Information	
.1				
	i.	System description documents.	Documentation	
	ii.	Installation, Operation and Maintenance documents.	Documentation	
	iii.	Installation, Operation and Maintenance documents.	Documentation	
	iv.	Repair manual.	Documentation	
9.3.1.2		System description documents: The following system description documents shall be supplied along with the system:	Information	
	a.	Over-all system specification and description of hardware and software.	Documentation	
	b.	Equipment layout drawings.	Documentation	
	c.	Cabling and wiring diagrams.	Documentation	
	d.	Detailed specification and description of all Input / Output devices.	Documentation	
	e.	Adjustment procedures, if there are any field adjustable units.	Documentation	
	f.	Spare parts catalogue of OEM supplied hardware modules and interconnect cables to be provided.	Documentation	
	g.	The list of software/ firmware installed on the Server along with versions and brief description to be provided.	Documentation	
	h.	The list of application software packages installed on the Server along with versions and brief description to be provided.	Documentation	
	i.	Program and data listings.	Documentation	

	j.	Graphical description of the system. In addition to the narrative description a functional description of the system using the functional Specification.	Documentation	
9.3.1.3		System operation documents: The following system operation documents shall be available:	Information	
	a.	Installation manuals and testing procedures.	Documentation	
	b.	Precautions for installation, operations and maintenance.	Documentation	
	c.	Operating and Maintenance manual of the system.	Documentation	
	d.	Safety measures to be observed in handling the equipment.	Documentation	
	e.	Man-machine language manual.	Documentation	
	f.	Fault location and troubleshooting instructions including fault dictionary.	Documentation	
	g.	Test jigs and fixtures required and procedures for routine maintenance, preventive maintenance and unit / card / sub- assembly replacement.	Documentation	
	h.	Emergency action procedures and alarm dictionary.	Documentation	
9.3.1.4		Training Documents		
	a.	Training manuals and documents necessary for organizing training in installation, operation and maintenance and repair of the system shall be made available.	Documentation	
	b.	Any provisional document, if supplied, shall be clearly indicated. The updates of all provisional documents shall be provided immediately following the issue of such updates.	Documentation	
	c.	The structure and scope of each document shall be clearly described.	Documentation	
	d.	The documents shall be well structured with detailed cross- referencing and indexing enabling easy identification of necessary information.	Documentation	
	e.	All diagrams, illustrations and tables shall be consistent with the relevant text.	Documentation	

9.3.1.5		Repair Manual:		
	a.	List of replaceable parts used.	Documentation	
	b.	Detailed ordering information for all the replaceable parts.	Documentation	
	c.	Procedure for trouble shooting and sub-assembly replacement.	Documentation	
	d.	Test fixtures and accessories for repair.	Documentation	
	e.	Systematic trouble shooting charts (fault tree) for all the probable faults with their remedial actions.	Documentation	
9.3.2		Installation:	Information	
	a.	All necessary interfaces, connectors, connecting cables and accessories required for satisfactory installation and convenient operations shall be supplied. Type of connectors, adopters to be used shall be in conformity with the interfaces defined in this GR.	Declaration	
	b.	The diagnostic software utilities and support required for carrying out the testing of the equipment before final commissioning shall be supplied with the equipment	Declaration	
	c.	All installation materials, consumables and spare parts to be supplied.	Declaration	
	d	All literature and instructions required for installation of the equipment, testing and bringing it to service shall be made available in English language.	Declaration	
	e.	For the installations to be carried out by the supplier, the time frames shall be furnished by the supplier including the important milestones of the installation process well before commencing the installations.	Declaration	
	f.	The equipment shall have:	Information	
		i) Proper earthing arrangement.	Declaration	
		ii) Protection against short circuit / open circuit.	Declaration	
		iii) Protection against accidental operations for all switches / controls provided in the front panel.	Declaration	

		iv) The racks housing the server should have the protection against entry of dust, insects and lizards.	Declaration	
9.3.3		Software Maintenance:	Information	
9.3.3.1		All the software updates shall be provided on continuous basis for a minimum period of 5 years from the date of induction of system in the service provider' s network. These updates shall include new features and services and other maintenance updates.	Declaration	
9.3.3.2		The software for the support of all protocols and interfaces mentioned in this GR shall be ensured in the devices.	Declaration	
9.4		Minimum Equipments for Type Approval testing: Any Type and Category of Servers can be offered for Type Approval Certificate at least with the minimum configuration and the same shall be mentioned in the Type Approval Certificate. The Type Approval certificate shall be issued for the offered Type and category.	Information	
10.0		Desirable Requirements	Information	
		This chapter describes the desirable requirements for the Servers and will depend upon the application of the Servers. Hence the tendering authority may choose out of the features mentioned below as per requirement.	Information	
10.1		Database Management Requirement applicable to Servers planned for Database Applications	Information	
10.1.1		The Server shall have the capability to automate monitoring, data collection and analysis of performance from single point.	Declaration	
10.1.2		The Server shall set threshold and send notifications when an event occurs, enabling database administrators (DBAs) to quickly trace and resolve performance-related bottlenecks.	Functional Verification	
10.1.3		The Server shall have the Database performance management solution for Distributed RDBMS includes hundreds of predefined scans for monitoring various database, operating system and network resources. This minimizes the need to write and maintain custom scripts. One can modify an existing script to meet a special monitoring situation or requirements.	Functional Verification	

10.1.4		The Server shall Report conditions that exceed threshold with respect to user-defined parameters and automatically takes corrective actions.	Functional Verification	
10.1.5		The Server shall send alerts for an array of server conditions, including inadequate free space, runaway processes, high CPU utilization and inadequate swap space.	Functional Verification	
10.1.6		The Server shall provide threshold and alarms to proactively react to problems.	Functional Verification	
10.1.7		The Server shall create real-time, historical custom graphs and stacks for comparison, correlation and trending across any collected database or database server.	Functional Verification	
10.1.8		After installation, the Server shall identify database changes automatically.	Functional Verification	
10.1.9		The Server shall support historical archive store for performance information in a compressed time-series form. DBAs can drill down through layers of data to discover the cause of a condition occurring with the databases, operating system or network. The historical reports shall be used to perform trend analysis and capacity planning.	Functional Verification	

10.1.10		The Server shall support trace, analyse and tune resource consuming SQL statements.	Declaration	
10.1.11		The Server shall support platform independent, browser based console to monitor performance, analyse and take corrective actions from remote locations.	Declaration	
10.2		Cloud Ready features	Information	
10.2.1		Infrastructure management	Information	
	a.	The Server shall have the capability to provide proactive notification of actual or impending component failure alerts. Automatic Event Handling shall be supported to configure actions to notify appropriate users of failures through e-mail, pager, or Short Message Service (SMS) gateway.	Functional Verification	
	b.	The Server shall have automatic execution of scripts or event forwarding to NMS as per TEC GR.	Declaration	
	c.	The Server shall support task initiation on multiple systems or nodes from a single command on the management system to eliminate the need for tedious, one-at-a-time operations performed on each system.	Functional Verification	
	d.	The Server shall provide the option of a browser-based GUI or a command line interface (CLI) to make it easy to incorporate into your existing management processes.	Functional Verification	
10.2.2		Remote Management	Information	
	a.	The Server shall support embedded hardware Graphical Remote Console capabilities of the servers that can turn a supported browser into a virtual desktop, giving the user full control over the display, keyboard, and mouse of the host server.	Declaration	
	b.	The Server shall support integration with enterprise-class directory	Declaration	

		services like Microsoft Active Directory and LDAP to provide secure, scalable, and cost effective user management.		
	c.	The server shall support real time Virtual KVM functionality and be able to perform a remote Power sequence. The server shall support both Java / Java-free browsing options.	Declaration	
	d.	The server shall be able to connect using popular mobile devices like Apple IOS and Android based devices.	Functional Verification with one Mobile Device and Declaration for all other popular mobile devices and OS' s.	
	e.	The server shall support management of core system components out-of-band without involving SNMP or WBEM on operating system.	Declaration	
	f.	The server shall have the ability to map the remote media to the server. The server shall support file transfer from the user' s desktop/laptop folders to the remote server with only the Lights-Out network connectivity.	Declaration	
	g.	The server shall have the ability to capture the video sequence of the last failure and the boot sequence and also playback the video capture.	Functional Verification	

	h.	The server shall have the ability for multiple administrators across remote locations to collaborate on the remote session even in a server lights-out mode (with a maximum of 6 sessions)	Declaration	

10.2.3		Power Management	Information	
	a.	The server shall be able to show the actual power usage and actual thermal measurements data of the servers. Must also show a historical trend of power and temperature and generate comprehensive power reports.	Functional Verification	
	b.	The server shall support integration with facilities management software to enable planning on actual power consumption.	Functional Verification	
	c.	The server shall be able to automatically shutdown the servers if required, based on user policies and schedules	Functional Verification	
	d.	The server shall be able to dynamically optimize the power usage and performance based on server workload policy.	Functional Verification	
	e.	The server shall be able to cap the power of individual server or a group of servers. The server shall be able to intelligently assign the power to the appropriate server in the pool based on policy settings.	Functional Verification	
	f.	The server shall be able to support power discovery of servers and blades to help visualize data centre thermals.	Functional Verification	
10.2.4		Performance Management & Alerting	Information	
	a.	The server shall have the ability to perform a hardware level (32 bit & 64 bit) measurement. The server shall also monitor CPU, I/O, Memory, Storage & Network.	Functional Verification	
	b.	The server shall have ability to compare the hardware performance with known performance capabilities of each component.	Functional Verification	
	c.	The server shall have the ability to provide comprehensive recommendations for the issue and the resolution.	Functional Verification	
	d.	The server shall have the ability to automatically trigger events and alerts based on performance issues or thresholds set	Functional Verification	

	e.	The server shall be able to events when the performance state of a server changes. Should detect these changes early, displaying a warning before an actual bottleneck happens.	Functional Verification	
10.2.5		Deployment	Information	
	a.	The server shall have the capability of deploying Operating Systems on multiple servers simultaneously and also be able to schedule deployment as and when needed.	Declaration	
	b.	The server shall have the capability to perform scripted installation of most popular Operations Systems to reduce the time required in deployment.	Declaration	
	c.	The server shall have the capability of capturing and deploying OS images	Declaration	
	d.	The server shall have the capability of configuring the hardware and changing system settings such as RAID level before the deployment of the Operating System. The server shall also have the capability of capturing the hardware settings and replicating it across servers.	Declaration	
10.2.6		Integration with Enterprise Management software	Information	
	a.	The server shall have the ability to get event and traps from the Data Centre equipments and enterprise management software.	Declaration	
	b.	The server shall have the ability to send the alerts directly to the vendor via a secure connection for a quick fix.	Declaration	
10.2.7		Server Migration	Information	
	a.	The server shall have ability to perform a Physical-to-virtual (P2V) migration (Migrates a physical machine to a virtual machine guest in a virtual machine host) and Virtual-to-virtual (V2V) migration. (Migrates a virtual machine guest between virtualization layers)	Declaration	
10.2.8		Virtual Machine Management	Information	
	a.	The server shall be able to provide control functions for virtual machines from a single management software	Declaration	
	b.	The server shall be able to provide failed hosts recovery by assigning alternate hosts to VMs	Declaration	

	c.	The server shall be able to provide central management and control for virtual machines hosted on Microsoft Hyper-V server, VMware ESX Server, or Xeon RHEL or SLES.	Declaration	
10.2.9		Reporting	Information	
	a.	The server shall be able to generate various reports based on formats using the latest industry standards	Functional Verification	
	b.	The server shall support reporting. Reports communicate power and thermal information -- from individual server utilization to data- centre-level summaries and analysis. Reports on under-utilized servers identify those that are power hogs, are idle but still running, or are decommissioned but not powered off.	Functional Verification	
	c.	The server shall have the ability to generate reports for system bottleneck state and overall performance utilization	Functional Verification	
10.2.10		Cloud Security Features: The cloud security features as per international standards shall be supported.	Declaration	

		CHAPTER-2			
11.0		Tendering Information			
11.1		Guidelines for the Tendering Authority		Information	
		The tendering authority shall specify the following parameters			
		1	Type of Server	Information	
		2	Category of Server		
		3	Type of input Power Supply i.e. AC, DC or Both		
		4	Requirement of Operating System in case of CISC Servers		
		5	No of Blades to be populated in case of Blade Server OR No of Blades to be populated shall be decided by the supplier based on the specified performance objectives required for the application		
		6	No. of CPU cores and Memory size to be equipped in case of High end server. OR The CPU core and Memory requirement shall be decided by the supplier based on the specified performance objectives required for the application (E.g. No. of CDR' s to be processed in a CDR application or No. of Customers to be supported in a CRM application etc)		
		7	Requirement of Memory Size corresponding to clause 3.2.1 (8)		
		8	Requirement of Memory Type corresponding to clause 3.2.1 (9)		
		9	Requirement of Type & Number of Ethernet port supported corresponding to clause 3.2.1 (15)		
		10	Requirement of Type & Number of PCIe Slots corresponding to clause 3.2.1 (17)		
		11	Requirement of Internal Storage Capacity corresponding to clause 3.2.1 (21)		
		12	Processor Generation corresponding to clause 3.7.1		
		13	Support for Precision Time Protocol (PTP) corresponding to clause 3.11(b)		

		14	Requirement of Type & No. of Physical Interfaces corresponding to clause 4.1 (4)		
		15	Requirement of database management for servers to be used as database servers as per clause 10.1		
		16	Requirement of cloud ready features as per clause 10.2		
		17	Requirement of clustering software		
		18	For optional features, the requirement if any may be stipulated by tendering/purchasing authority		

I. TEST SETUP C PROCEDURES:

1. Test No.	
2. Test Details	*Name and Other relevant details*
3. Test Instruments Required	1. <Name> 2.
4. Test Setup	
5. Test Procedure	*Testing Steps may be written here….* 1) ..... 2) ..... 3) .....
6. Test Limits	(if any)
7. Expected Results	1. **.....**<values>.....**.....** 2. **.....**<values>...**.....** 3. Other tests (test name)

Further Test Setup & Procedures may be added as per requirement

J. SUMMARY OF TEST RESULTS

TEC Standard No._____

TEC Test Guide No._____

Equipment name & Model No.

_____

Clause No.	***Compliance*** *(Complied /Not Complied / Submitted/Not Submitted / Not Applicable)*	***Remarks /*** ***Test Report Annexure No.***

[Add as per requirement]

Date:

Place: ***Signature & Name of TEC testing Officer /***

**** Signature of Applicant / Authorized Signatory***

Annexure

Comments on Revision of Test Guide Titled "SERVER"

(Draft Test Guide Standard No. TEC 48141:2025)

Name of

Manufacturer/Stakeholder:

Organization:

Contact details:

Clause No.	Clause	Comments	Other Remarks, if any

Note: The comments on the revision of Test Guide titled "Server" may be provided in the above format vide Email to adic1.tec@gov.in , adit2.tec-dot@gov.in, dirit2.tec-dot@gov.in