

TECHNICAL SPECIFICATIONS FOR AUDIO-VISUAL (AV) WORKS

TABLE OF CONTENTS

I. PREFACE 2

 A. Tropical Conditions 2

 B. General:..... 2

II. SPECIFICATION 2

I. PREFACE

A. Tropical Conditions

All equipment/material supplied against respective Specification shall be suitable for satisfactory continuous operation, storage & maintenance under tropical conditions as specified below:

- Ambient temperature : 45 degree Celsius
- Annual Average Relative humidity : 50%
- Isokeraunic level (days per year) : 50
- Seismic Zone : Zone-IV
- Climate type : Moderately hot and humid tropical, climate, conducive to rust and fungus growth

B. General:

The Security work shall be carried out in accordance with Indian Standard Code of Practice. It shall also be in conformity with the current Indian Electricity rules and regulations and requirements of the Local Electricity Supply authority and Fire Insurance regulations so far as these become applicable to the installation.

The scope includes the jobs to be performed for all equipment and materials furnished under this specification. The scope is however not limited to the items detailed below:

- Design, manufacture, testing at manufacturers works packing and dispatch.
- Transportation to site and insurance.
- Receiving at site, unloading, handling, opening, inspecting, reporting and submitting claims in case of damages and short supply items.
- Arranging to repair/re-ordering all damaged and short supply items.

II. SPECIFICATION

Audio Video Solution with Video Conference System

The scope of service for the AV System Integrator (AVSI) is to Supply, Install, Test & Commission and Maintenance the systems as per the design given in the tender drawings and the specifications included in this document. It is the responsibility of the AVSI to read the tender documents through completely and understand all of the requirements and have to take consent and approval from QCI and Consultant jointly.

Special Condition for System Integrator:

- The Contractor will supply and install the equipment necessary to meet the requirements and provide all labour and materials, whether or not described in full, necessary to produce complete and fully operational systems in accordance with the intent of this document.
- The Contractor/ Agency must familiarize himself with the site drawings and the scope of the facilities that is required in the various areas. Should ensure that agency is aware of the operational requirements under which the systems and associated facilities are to be installed and used.
- All employees used by the contractor/agency to install this system must be competent technicians who are experienced in the installation and interconnection of professional audio visual systems.
- Bidder shall be authorized by the manufacturer of the major components of the system to sell their products and initiate warranty service on the same items for this project. Major components of the system shall include, but not be limited to, data/video projectors, display panels, video processing equipment such as switchers, audio processing equipment, power amplifiers, speakers, etc.

- Manufacturing authorization letter must be submitted for this Work addressing to Client stating that bidder is authorized to provide sales and services on behalf of OEM.
- In view of the above, commissioning and programming will have to be carried out to integrate all the system architecture hardware and software – to synchronized Audio, Video controlled through Control Processors, etc. complete
- **Submittals:**
 - Compliance Statement- (Mandatory)
 - Datasheet- (Mandatory- Relevant Pages only)
 - Bill of Quantity- (Mandatory)
 - Drawings as required
 - Manufacture Authorization Letter (Mandatory)
 - OEM Partner Certification
 - No Deviation Certificate (for Technical Compliance) on OEM latter head (Mandatory).
- **Makes and Models:** - It is mandatory to provide make and model of the items and their subcomponents as has been sought in the technical bid. Please note that substituting required information by just brand name is not enough. Bidder should not quote hardware or software items which are impending End of Life or End of Support during the contractual period.
- **Software, Drivers and Manuals:** - The bidder shall supply along with each item, all the related documents, Software Licenses and necessary media of the software loaded in the equipment without any additional cost. The media and documents shall be in English. These will include, but not restricted to, User Manual, Operation Manual, Other Software and Drivers etc.
- **Warranty:** The Contractor/ Agency shall Warranty that all provided material and equipment will be free from defects, workmanship and will remain so, for a period of 12 months from after equipment/materials have put into the service or from date of final acceptance of system by Engineer In charge / Consultant whichever is earlier.
- The Contractor/ Agency shall provide summary of all equipment's serviced quarterly during this Warranty period to facility in charge or QCI. The report shall clearly mention services rendered, parts replaced and repairs performed.

Software & Programming:

- Any software, license or programming, whether or not specifically mentioned, but if required for successful installation, testing, commissioning and functioning of the all equipment and systems installed by the contractor, the same shall be in the scope of the contractor. All such software required shall be fully-loaded, genuine, latest versions, shall be as per OEM's specifications/ recommendations, shall not be trial versions or limited- feature or limited-period versions (unless the specified Model no. / Code no. means so) and shall not involve any extra or recurring cost.
- The rate quoted by the contractor shall be inclusive of all such required software and programming and the contractor shall be responsible for making the entire system operational as per tender specification and no extra shall be paid to the contractor on this account.

Compatibility of System

- It shall be contractor's obligation to ensure that all the software, hardware, equipment, and AV systems, including input-output connectors/ port/ terminals, are seamlessly compatible with one another. Any specific provisions, if required to be made on this account this, shall be done by the contract without compromising the performance of the AV system and without any extra cost. The rate quoted by the contractor shall be inclusive of all such required software and programming and no extra shall be paid to the contractor on this account.
- Similarly, the contractor shall ensure that the speaker's wattage and corresponding amplifiers are selected and proposed in a manner that they are compatible with one another.
- The contractor shall ensure that the equipment being proposed are the prevalent models/ series of the OEM.

Size of LED / Video Wall Display Panel

- The contractor shall supply the LED display panel as per the specifications given in the Bidding document. However, a variation in screen diagonal size of the LED panel up to +5" (Plus Five inches) shall be acceptable as decided by Engineer in charge, whose decision shall be final in this regard. The bidder shall quote the price accordingly and no extra amount shall be paid on account of this.

Connector / Adaptors / Convertors / Ports

- The connectors/ adaptors/ convertors/ports required in making connections between various equipment, cables or terminating cables into equipment shall be provided and installed by the contractor as per industry standards, design and site requirements, if not specified in the bidding document. The rates quoted by the contractor for equipment and cables shall be inclusive of connectors (except in case SOR items is available for such connector in the bidding document) and no extra shall be paid to the contractor on account of this.

Power and LAN Supply to the AV Equipment

- The contractor shall take power and LAN connections for the Audio-Visual equipment from the prescribed electrical and LAN points already installed in each of the rooms. It shall be contractor's obligation to ensure necessary coordination in this regard with Engineer in Charge and other agencies working at site. The rates quoted by the contractor shall be inclusive of this and no extra shall be paid to the contractor on account of this. Decision of Engineer in charge regarding the same shall be final and binding upon the contractor

Hardware, Accessories and Mounting etc.

- The contractor shall provide all necessary hardware, accessories, mounting kits etc. required for appropriately and safely mounting the equipment shall be as per the requirements of the equipment, OEM's recommendations (if any), site conditions, technical specifications and as approved by Engineer in charge. The rates quoted by the contractor shall be inclusive of this and no extra shall be paid to the contractor on account of this. (except in case SOR items is available for such connector in the bidding document).

Operating Conditions

- All Equipment enlisted in this tender shall be suitable for operating under following environmental conditions or as specified in individual Equipment Data Sheet, whichever is stringent.
- There may be equipment which operate on DC supply or Power-over-Ethernet (PoE) as per manufacturer's specifications. The contractor shall supply and install the equipment along with the necessary adaptor, power cords, Ethernet cables/ cords (in cases where Ethernet cable is meant only for supply of power and not for communication or LAN), or any other provision required as per manufacturer's specifications. The rates quoted by the bidder shall be inclusive of this and no extra amount shall be paid to the contractor on account of this.

Special Condition for OEM's / Manufacturer:

- The OEM should have a direct presence in India for the past 5 years. This ensures that the company has established itself in the local market and understands the regional requirements and challenge
- The OEM should have its own warehouse / Office in India for timely supplies of products and spares. This local warehousing or Local Office capability minimizes delays in the supply chain, ensuring that products and spare parts are readily available when needed
- The OEM should have at least one service centre locally to provide prompt after-sales service and support, ensuring any issues can be addressed quickly and efficiently
- The OEM should provide a Customer PO copy of at least one project which is a minimum of five years old to prove their presence in India. This demonstrates the company's long-term engagement and reliability in the local market
- The OEM should provide Three project references which are a minimum of one year old in Delhi NCR, which shall be visited as and when required. These references are essential for validating the company's performance and customer satisfaction in the region
- The OEM for Audio (Microphone, DSP, Loudspeakers, Amplifiers), Unified communication bar and Video Switching should provide necessary certifications of alliances with leading Cloud-based VC platforms. This ensures that the products can integrate with modern virtual communication technologies, which is increasingly important in contemporary audio-visual system
- Compliance of Technical specifications along with cross reference and DBR/SOW/Employer requirement on OEM letter head should be submitted along with bid.
- The bidder should submit the training certificates of the product quoted (especially Audio Video products) from the respective OEM's. The certificate should not be more than 01 year old

Detailed Specification:

Sr NO	Item Description	Compliance
1	Direct View LED Video Wall Screen	(Yes / No)
	136" LED Wall AIO screen with 1.58 mm pixel pitch and floor stand from same OEM	

	16:9 aspect ratio with diecast aluminium cabinets,	
	Minimum Resolution Full HD/1920x1080 or better,	
	with controller inbuilt	
	Sound of 30Watts	
	Minimum inputs combination of 2 x HDMI 2.0, 1 x DP, 4 x USB,	
	Sound Out for speakers ,	
	Rs232/LAN for ethernet	
	Max Brightness 600 nits or better with HDR,	
	Refresh rate 3840 Hz or better,	
	Contrast 10,000:1 or better,	
	160 x 160 Viewing Angle,	
	Colour Temperature 3000 to 10000 Adjustable or more,	
	Brightness Uniformity 97% or better,	
	Inbuilt OS Windows/ Android/ Tizen/WebOS	
	Inbuilt speakers, remote controller,	
	Standby power mode supported to save energy and Max load should not be more than 1.5KW with Plug & play power cable.	
	Smart features like signage inbuilt, wireless mirroring etc.	
	Optional inbuilt touch	
	Submitted Product data sheet must be available in public domain	
2	98" Professional Ultra HD Display Panel	
	4K UHD(3840 X 2160) Resolution	
	Brightness 600 Cd/m2 or more,	
	Android 11.0 based SOC with Quad Core Processor,	
	ARM Mali G51 GUP, 4 GB RAM, 32 GB Memory,	
	Interface: 2 HDMI 2.0, DisplayPort 1.2 input (Shared with USB Type C), 1 USB 3.0, 1 USB 2.0, 1 RJ45, 1 RS232, 1 Audio Out, 1 Digital Audio Out, 1 HDMI 2.0 Output,	
	24 Watt or more in built speaker,	

	24/7 Operation,	
	Wifi(Optional dongle), Bluetooth,	
	No signal Power Off,	
	RS232 and LAN Control,	
	OSD and UI rotation,	
	USB Auto play function,	
	Multi-screen support up to 3 x 3,	
	Multi-functional USB Type C (for Audio, Video, Network, Microphone, 65W charging, Camera connectivity),	
	Wireless Screen sharing with Airplay, Miracast and Mirroring,	
	PIP/PBP support, Landscape and Portrait mode,	
	In stand mobile content transfer, Multi-mode play,	
	Content scheduling and signage software.	
	Device management system compatible,	
	OPS Slot available	
	Submitted Product data sheet must be available in public domain	
	BIS Certified	
3	85" / 75" / 65" / 55" / 43" Professional Ultra HD Display Panel	
	4K UHD (3840 X 2160) Resolution,	
	Brightness 500 Cd/m2 or more,	
	Android 11.0 based SOC with Quad Core Processor,	
	ARM Mali G51 GUP, 4GB RAM, 32GB Memory,	
	Interface: 2 HDMI 2.0 Inputs, DisplayPort 1.2 input (Shared with USB Type C), 1 USB 3.0, 1 USB 2.0, 1 RJ45, 1 RS232, 1 Audio Out, 1 Digital Audio Out, 1 HDMI 2.0 Output,	
	24 Watt or more in built speaker,	
	24/7 operation, WIFI (Optional dongle), Bluetooth,	
	No signal Power Off,	
	RS232 and LAN Control, OSD and UI rotation,	

	USB Auto play function,	
	Multi-screen support up to 3 x 3,	
	Multi-functional USB Type C(for Audio, Video, Network, Microphone, 65W charging, Camera connectivity),	
	Wireless Screen sharing with Airplay, Miracast and Mirroring,	
	PIP/PBP support, Landscape and Portrait mode,	
	In stand mobile content transfer,	
	Multi-mode play,	
	Content scheduling and signage software.	
	Device management system compatible	
	Submitted Product data sheet must be available in public domain	
	BIS Certified	
4	65" / 75" Multi touch Interactive display	
	Multi touch Interactive display with built in SOC with 1.9 GHz Quad core processor,	
	Android 13.0,	
	4 GB RAM, 32 GB Memory,	
	Brightness 450 Cd/m2 or more,	
	3 mm 7 MOHS Tempered Glass,	
	5 GHz WIFI built in, Interface: 3 HDMI Input, 1 HDMI Out, 4 USB A 3.0, 1 USB 2.0, 1 USB Type C 3.0, 1 RJ45, 1 RS232, 1 Audio Out, 1 Audio Input, 1 VGA input,	
	2 x 20W or more Front Facing Speakers,	
	40 Point Touch for Windows, 10 point Touch for Android,	
	OPS Slot,	
	Built- in white board, Writing, Pen, Palm Eraser, Save, Screen Capture, Storage and Tool Bar.	
	Supports 3rd party applications, recording feature,	
	USB WEB Cam Compatible,	
	Support PPT, Word, PDF, Image, Video Play	

	2 Touch Pen,	
	Compatible with Device Management Software	
	Submitted Product data sheet must be available in public domain	
	BIS Certified	
4	Fixed Wall Mount	
	Capable of holding up to 75 kg and supports 32" to 90" displays, VESA Compliant etc all complete	
5	Fixed Wall Mount	
	Capable of holding up to 110 kg and supports 75" to 98" displays, VESA Compliant etc all complete	
6	Adjustable Drop Universal Flat Screen Ceiling Mount	
	With of 625mm - 950mm adjustable drop, Screen size: up to 65", Max load: 50kg, Tilt adjustment: +/-15° etc all complete	
7	Floor Mount Trolley	
	Universal in design to fit 65" to 98" displays, can hold weight up to 120 kg, VESA compliant etc all complete	
8	Cable Cubby Type 1	
	with flip top having 2 Universal Power, 2 USB Charge with 1 Ethernet Cable / Connector, 1 Telephone Cable / Voice Connector, Spring Type Cable Retractor for 1 HDMI, 1 USB, and 1 USB-C etc all complete	
9	Cable Cubby Type 2	
	with flip top, cover and multi-format cables, 2 Universal Power, 2 USB Charger, 1 HDMI, 1 USB-C, 1 Ethernet Cable, 1 Telephone Cable / Voice Connector, made of steel and aluminium etc all complete	
10	Wooden lectern	

	With Dual wired microphone connectivity, 25" table top, with reading lamps, Cable management, Large reading surface as required with cables & connectors as required etc. all complete etc all complete	
11	10" Room Scheduler Display	
	10 Inch Multi-Touch display,	
	PoE+ Powered, portrait, landscape, and table-top Mounting, with Android SoC processor.	
	Native and web apps,	
	Resolution 1280 x 800 Pixels	
	Book directly on the screen,	
	Book in your normal calendar software,	
	Option to see all the details including room status, future schedule, and bookings,	
	Book as usual - via Outlook or Google Calendar, via the cloud, by using your smartphone / tablet, or directly on the screen outside of the meeting room or at the reception,	
	Supports MS Exchange Server,	
	No custom changes are required in the organization's calendar configurations,	
	Customise colours, logos, backgrounds, and components.	
	Option to easily customize access control and interactivity.	
	Use as read-only displays or fully interactive ones,	
	Highly secure on-prem deployment with no data transmission to our cloud or servers	
	Enable custom features and components	
	Easily manage all aspects of the device configuration centrally via your web browser using the Software Manager	
	Allows to add your own logo to the display, add own background, and choose the colours. It also allows you choose what components to display	
	leverages latest Web2.0 and HTML5 technologies to make the system more efficient and quick	
	shows all the available meeting spaces nearby as per the configuration decided by you. You can find the nearest available space in a click etc all complete	

12	Content Management System (CMS) for digital signage (Per display)	
	On-premise / Cloud-based,	
	Intuitive dashboard for content scheduling, layout design, and performance monitoring,	
	Ability to manage a single display or a network of displays from a centralized system,	
	Support for a growing number of displays without performance degradation,	
	Media Format Support: Video: MP4, MOV, AVI, WMV, Images: JPEG, PNG, BMP, HTML5 and animations,	
	Divide each display into multiple regions to show different types of content (e.g., video in one zone, news ticker in another),	
	Dynamic Content Support,	
	Time-based scheduling: Daily, weekly, or monthly schedules,	
	Event-based scheduling: Content triggered by specific conditions (e.g., time of day or audience proximity),	
	Drag-and-drop functionality to arrange and update playlists for individual displays,	
	Automatic content scaling to fit display size,	
	Push content via the internet, LAN, or local storage,	
	Displays can continue running pre-downloaded content without an active connection,	
	Keep detailed logs of when and where content was displayed etc all complete	
13	Wireless presentation module	
	Native protocols: Airplay, Google Cast, Miracast,	
	Maximum number of simultaneous connections (with Buttons and/or App): 32, Local view,	
	Management and reporting,	
	Frequency band: 2.4 GHZ and 5 GHZ, LAN & WiFi,	
	4K UHD output, USB-A and USB-C port,	
	100% secure, encrypted and cloud-managed	

	with Two buttons, no cables, no software to download needed etc all complete	
	Submitted Product data sheet must be available in public domain	
14	4K Network PTZ Conference camera with minimum 12x optical zoom	
	With minimum 12x optical zoom & 80-degree horizontal coverage.	
	Low Noise CMOS 4K image sensor with User-configurable resolution and quality for IP streams (up to 1080p).	
	HDMI resolutions up to 4K30 or better and SDI-3G resolution up to 1080p60 or better.	
	Image rotation controls to allow for inverted mounting using ceiling bracket.	
	Minimum Illumination - 0.5 Lux @ (F1.8, AGC ON) or better,	
	Horizontal Rotation Range - $\pm 170^\circ$, Vertical Rotation Range - -30° to $+90^\circ$ or better,	
	White Balance controls- Auto, indoor, outdoor, one-push, manual, specified colour temperature or better.	
	Camera should be able to transmit video via network to USB endpoint connected for video conferencing.	
	Power – PoE & AUX.	
	Voice tracking facility by integration with Tabletop wireless conference unit for Chairman/Delegate and Ceiling Array microphones	
	Shall include wall mounting bracket included etc all complete	
	Submitted Product data sheet must be available in public domain	
15	4K Network PTZ Conference camera with minimum 20x optical zoom	
	With minimum 20x optical zoom & 60-degree horizontal coverage.	
	Low Noise CMOS 4K image sensor with User-configurable resolution and quality for IP streams (up to 1080p).	
	HDMI resolutions up to 4K30 or better and SDI-3G resolution up to 1080p60 or better.	
	Image rotation controls to allow for inverted mounting using ceiling bracket.	
	Minimum Illumination - 0.5 Lux @ (F1.8, AGC ON) or better,	
	Horizontal Rotation Range - $\pm 170^\circ$, Vertical Rotation Range - -30° to $+90^\circ$ or	

	better,	
	White Balance controls- Auto, indoor, outdoor, one-push, manual, specified colour temperature or better.	
	Camera should be able to transmit video via network to USB endpoint connected for video conferencing.	
	Power – PoE & AUX.	
	Voice tracking facility by integration with Tabletop wireless conference unit for Chairman/Delegate and Ceiling Array microphones	
	Shall include wall mounting bracket included etc all complete	
	Submitted Product data sheet must be available in public domain	
16	HD Visual Communications System	
	SIP, H.323, Enabling High-Definition Web Conferences,	
	Video Compression Method: H.261 (mainstream only), H.263, H.263+, H.263++ (reception only), H.264 High Profile, H.264 Baseline Profile,	
	Video Input: 1 HDMI, 1 PC, Video output: 2 HDMI, IP mode,	
	NAT Traversal mode, IP / NAT Traversal mode etc all complete	
	Submitted Product data sheet must be available in public domain	
17	Intel Celeron Mini-PC	
	Windows 10 IOT License, One time Up to 4 users wireless screen shares & Quad-view Support	
	Preinstalled suite of Video conferencing apps	
	720p Camera Support	
	Single Display Support	
	Online dashboard support with wireless keyboard and mouse etc all complete	
18	Universal Switcher with HDMI and USB-C connectivity Type 1	
	1 HDMI, 1 USB-C Inputs and 1 HDMI Outputs with audio out,	
	USB-C input connectivity for 4K Video, Audio, Data, and Power (Video, Audio	
	Data and Power over a single USB-C connection)	

	Supports HDMI 4K signal formats (4K UHD @ 60Hz RGB 4:4:4, up to 18 Gbps)	
	Multiple USB 3.1 Gen 1 connectivity for any type of USB devices (Camera, speakerphone, touch monitor, USB-HID devices)	
	1 USB Type B, 4 USB Type A, USB 3.1 Gen 1, USB 2.0, USB 1.1 compliant	
	USB-C charging up to 1 x 60W, depending on the AC/DC power supply type (from Firmware V1.4)	
	Supports HDMI 4K signal formats (4K UHD @60Hz RGB 4:4:4, up to 18 Gbps)	
	CEC at the HDMI outputs	
	USB 3.1 Gen 1, USB 2.0, USB 1.1 compliant	
	Audio de-embedding	
	GPIO control ports	
	Uncompressed video up to 18 Gbps data rate (600 MHz pixel clock)	
	Submitted Product data sheet must be available in public domain	
19	Universal Switcher with HDMI and USB-C connectivity Type 2	
	2 HDMI, 2 USB-C Inputs and 2 HDMI Outputs with audio out,	
	USB-C input connectivity for 4K Video, Audio, Data, and Power (Video, Audio	
	Data and Power over a single USB-C connection)	
	Supports HDMI 4K signal formats (4K UHD @60Hz RGB 4:4:4, up to 18 Gbps)	
	Multiple USB 3.1 Gen 1 connectivity for any type of USB devices (Camera, speakerphone, touch monitor, USB-HID devices)	
	2 USB Type B, 4 USB Type A, USB 3.1 Gen 1, USB 2.0, USB 1.1 compliant	
	USB-C charging up to 2 x 60W, depending on the AC/DC power supply type (from Firmware V1.4)	
	Supports HDMI 4K signal formats (4K UHD @60Hz RGB 4:4:4, up to 18 Gbps)	
	CEC at the HDMI outputs	
	USB 3.1 Gen 1, USB 2.0, USB 1.1 compliant	
	Audio de-embedding	
	GPIO control ports	
	Uncompressed video up to 18 Gbps data rate (600 MHz pixel clock)	

	Submitted Product data sheet must be available in public domain	
20	8 Inputs and 8 Outputs HDMI 2.0 Compatible Full 4K Matrix Switcher	
	8 Inputs and 4 Outputs HDMI 2.0 Compatible Full 4K Matrix Switcher	
	Supports HDMI 4K signal formats (4K UHD @60Hz RGB 4:4:4, up to 18 Gbps)	
	HDMI 2.0, HDMI 1.4 and DVI 1.0 compliant	
	HDCP 2.2 and HDCP 1.4 compliant with cross conversion capabilities	
	HDR and Low Latency Dolby Vision support,	
	Audio de-embedding	
	Advanced EDID Management	
	Fully non-blocking switching architecture	
	Device control via Ethernet (TCP/IP), RS-232 and USB	
	while supporting 3D, Dolby True-HD and DTS-HD Master Audio	
21	AVX (non-switchable) HDMI 2.0 Extender (Transmitter / Receiver)	
	Supports HDMI 4K signal formats (4K UHD @60Hz RGB 4:4:4, up to 18 Gbps),	
	Signal Type: HDMI 2.0, HDMI 1.x, DVI,	
	Maximum data rate: 18 Gbps,	
	Bi-directional PoC remote powering,	
	Extends HDMI 2.0, audio, Ethernet, RS-232 up to 100m over one CATx cable,	
	HDR and Low Latency Dolby Vision support,	
	Bi-directional RS-232 extension (pass-through),	
	HDCP 2.3 compliant (transparent pass-through),	
	Ethernet extension etc all complete	
	Submitted Product data sheet must be available in public domain	
22	Unified Communication Bar (All in One) with BYOD Type 1	
	Built-in DANTE integration,	

	Should have Built-In DSP which automatically optimizes room acoustics,	
	Integrated Beamforming microphone,	
	6 Nos. of MEMS capsules with pickup range of 4.5 m or more,	
	Should have 4K e-PTZ camera, 5x digital zoom with automatic framing and person tiling feature,	
	Built-in Class D amplifier with 4 Nos. of 40 W full range speaker,	
	Should have 2 HDMI, 1 USB Type-C (3.1), 1 USB Type-A (3.1),	
	Dual Ethernet ports,	
	Bluetooth 5.1 and IEEE 802.11a / b / g / n / ac Wi-fi standard,	
	Zooms and Teams certified,	
	High-precision audio settings for maximum control,	
	Setting to exclude (min 3) and prioritize the areas of the room,	
	which automatically focused on the person speaking in the room,	
	One Priority Zone and up to three Exclusion Zones shall be adjustable,	
	Should be controlled through centralized monitoring software along	
	with IR remote control and mounting kit etc all complete	
	Submitted Product data sheet must be available in public domain	
23	Unified communication bar with BYOD Type 2	
	Built-in DANTE integration,	
	Should have Built-In DSP which automatically optimizes room acoustics,	
	Integrated Beamforming microphone,	
	4 Nos. of MEMS capsules with pickup range of 3.5 m or more,	
	Should have 4K e-PTZ camera, 3x digital zoom with automatic framing and person tiling feature,	
	Built-in Class D amplifier with 2 Nos. of 20W full range speaker,	
	Should have 1 x HDMI, 1 x USB Type-C(3.1), 1 x USB Type-A(3.1), 1 x1000/100/10 Mbit/s (RJ45) ethernet ports,	
	POE powered,	
	5.1 Bluetooth and IEEE 802.11a /b /g /n /ac Wi-fi standard,	

	Zooms and Teams certified,	
	High-precision audio settings for maximum control, setting to exclude (min 3) and prioritize the areas of the room,	
	Should be controlled through centralized monitoring software along	
	which automatically focused on the person speaking in the room,	
	One Priority Zone and should be controlled through centralized monitoring software along	
	with IR remote control and mounting kit etc all complete	
	Submitted Product data sheet must be available in public domain	
24	Round Ceiling Mounted Beamforming Microphone Array	
	Shall consist of 15 pre-polarized condenser microphone capsules,	
	Shall use beamforming technology that automatically focuses on whoever is speaking in the room and always follows the person around the room,	
	Microphone array shall have a Dante interface for digital audio output,	
	Supporting both single-cable (PoE + Control + Dante) and split mode cabling (PoE + Ctrl / Dante) on a second RJ45 port,	
	Microphone sensitivity shall be 0 dBV/Pa (1020 mV/Pa).	
	Maximum sound pressure level shall be 98 dB SPL,	
	Dynamic range shall be 81 dB(A),	
	including a flush-mount installation kit etc all complete	
	Submitted Product data sheet must be available in public domain	
25	Ceiling microphone	
	Automatic dynamic Beamforming technology,	
	The beam will automatically detect the position of the person speaking and will follow the person around the room at all times.	
	It should have 2 x Dante digital audio (Redundancy), Analog audio out (Phoenix 3-pin), and Ethernet for Control and PoE connectivity ports.	
	The coverage of the ceiling microphone should be min 800 square feet or more.	
	It should have a true voice lift feature to increase audio intelligibility above	

	the ambient noise floor.	
	It should support IT industry standards like IEEE 802.1x.	
	It can be controlled through software that can control and monitor the microphone in any network.	
	It should have min 100 dB SPL, 5ms latency, and min 90dBA or higher dynamic range.	
	High-precision audio settings for maximum control, setting to exclude (min 5) and prioritize the areas of the room.	
	It should certified from Microsoft Teams and Zoom Video conferencing applications.	
	It should have UL 62368 certification (including UL 2043 testing and compliance) and safety certifications etc all complete	
	Submitted Product data sheet must be available in public domain	
26	Digital Wireless UHF handheld microphone set	
	Rack receiver having 56 MHz or higher of switching bandwidth	
	Equidistant spacing enables up to 90 channels or more along with 2,240 selectable frequencies for fine-tuning.	
	It should have auto scan feature for efficient connections to reduce time and effort.	
	It should have a minimum 100 meter transmission range.	
	It should have a Cardioid pick-up pattern,	
	Sound pressure level (SPL) : 150 dB or more,	
	System Latency : 1.9 MS, Dynamic range: 130 dB	
	Frequency response: 20Hz- 20000 Hz.	
	The microphone system can be controlled through iOS / Android applications via Bluetooth.	
	It should have 12 hours of operation life and more etc all complete	
	Submitted Product data sheet must be available in public domain	
27	Digital Wireless UHF lapel microphone set	
	Rack receiver having 56 MHz or higher of switching bandwidth	
	Equidistant spacing enables up to 90 channels or more along with 2,240	

	selectable frequencies for fine tuning.	
	It should have auto scan feature for efficient connections to reduce time and effort.	
	It should have min 100 meter transmission range.	
	It should have omni-directional pick-up pattern,	
	Sound pressure level (SPL) : 130 dB or more,	
	System Latency : 1.9 MS, Dynamic range: 130 dB and frequency response: 20Hz- 20000 Hz.	
	The microphone system can be controlled through ios / Android applications via Bluetooth.	
	It should have 12 hours of operation life and more etc all complete	
	Submitted Product data sheet must be available in public domain	
28	Digital Wireless UHF Headset microphone set	
	Rack receiver having 56 MHz or higher of switching bandwidth	
	Equidistant spacing enables up to 90 channels or more along with 2,240 selectable frequencies for fine tuning.	
	It should have auto scan feature for efficient connections to reduce time and effort.	
	It should have min 100 meter transmission range.	
	It should have cardioid pick-up pattern,	
	Sound pressure level (SPL) : 150 dB or more,	
	System Latency : 1.9 ms,	
	Dynamic range: 130 dB and frequency response: 20Hz- 20000 Hz.	
	The microphone system can be controlled through ios / Android applications via Bluetooth.	
	It should have 12 hours of operation life and more etc all complete	
	Submitted Product data sheet must be available in public domain	
29	Active Antenna Splitter	
	2 x 1:4 or 1 x 1:8 active connections,	
	which work on 56 MHz Bandwidth and allow for up to 90 channels,	

	Supports Mobile App streamlines setup and operation and eliminates complicated menus,	
	Frequency range: 470 – 694 MHz,	
	Along with Automated setup creates reliable connections	
	with minimal time and effort etc all complete	
	Submitted Product data sheet must be available in public domain	
30	Antenna booster	
	which work on 56 MHz Bandwidth and allow for up to 90 channels,	
	Supports Mobile App streamlines setup and operation and eliminates complicated menus,	
	Frequency range: 470 – 694 MHz,	
	along with Automated setup creates reliable connections	
	with minimal time and effort etc all complete	
	Submitted Product data sheet must be available in public domain	
31	Passive directional antenna	
	Built-in $\frac{5}{8}$ " and $\frac{3}{8}$ " threads allow for easy mic stand mounting,	
	Frequency range 470 – 1075 MHz,	
	Apex angle (-3 dB) approx. 100°,	
	Front-to-back ratio > 14 dB,	
	Gain typ. 5 dBi	
	and Impedance 50 Ω with Mounting plate for antenna etc all complete	
	Submitted Product data sheet must be available in public domain	
32	2x 2-way antenna splitter, passive	
33	Charging set with USB charger and 2 rechargeable battery packs	
	for handheld and bodypack transmitter.	

	It should charge 100% battery power in max. 3 hours charging time.	
	Maximum operating time of 12 hours.	
	Stackable and charging is through USB-C etc all complete etc all complete	
	Submitted Product data sheet must be available in public domain	
34	40 CM Gooseneck Shotgun Microphone	
	Hyper Cardioid pick-up pattern,	
	Frequency Response: 40 Hz – 20 kHz,	
	Nominal impedance: 50 Ohm,	
	Sensitivity: 18 mV/Pa,	
	Equivalent noise level: 23 dB (A)	
	with a table stand base with a programmable microphone button (Toggle on/off, PTM, PTT, and permanent on)	
	and a bi-colour LED ring for status indication along	
	with XLR-3 connector etc all complete	
	Submitted Product data sheet must be available in public domain	
35	Wireless Access Point supports the following functions and capabilities	
	Based on standard WiFi5 standard, IEEE802.11ac,	
	Clean channel manager that scans for the optimal channel use,	
	Operates in the limited access DFS channels maximizing the available spectrum,	
	Support up to 128 or more wireless devices,	
	3 x 2 MIMO antenna design with diversity to mitigate multipath effect resulting in robust wireless link,	
	Omni directional radiation pattern with range of 40m or more,	
	Highly secure by using WPA2 enterprise encryption,	
	Browser based configuration and monitoring software included,	
	Device discovery by physical button on WAP or via integrated web-based software,	

	Self-healing channel switching seamlessly switches to another channel when interference encountered or radar is detected on DFS channel,	
	Battery remaining meeting time visualization and low battery warning, Audio routing for external processing or distance conferencing,	
	Camera protocols providing device information to integrate 3rd party camera control systems, Mix-Minus mode,	
	Dante port: 1 x Dante port (8 x 8 channels), Balanced analog IN and OUT,	
	Recording capabilities: internal (4GB) or external storage (up to 500GB) and file download (MP3),	
	Number of open microphones, interpretation channels: 6 or more,	
	Latency : 16 MS, Audio: 48 kHz / 24 bit,	
	Frequency response: 20 - 20 kHz, THD (22 - 22000 Hz): < 0.02 %,	
	Dynamic range: > 90 dB, Signal to noise ratio: > 95 dBA,	
	RF frequency bands: 2.4 GHz / 5 GHz or better,	
	Multi-purpose mounting plate,	
	Certification: CE, PoE+ power adapter comes	
	with power plug set etc all complete	
	Submitted Product data sheet must be available in public domain	
36	Tabletop wireless conference unit for Chairman/Delegate	
	With removable microphone capability,	
	Multifunctional button for Chairman / Delegate,	
	Button for request-to-speak and priority functionality when unit is configured as chairperson or dual delegate / two request-to-speak functions button compatibility,	
	Built-in high-quality loudspeaker,	
	Minimum 1W or better,	
	Frequency Response: 200-20,000 Hz or better,	
	Speaker shall automatically muted when the microphone is active, to prevent acoustic feedback,	
	Unit provides information used by the clean channel manager for frequency coordination and interference avoidance,	

	Dual antenna for optimized signal reception even in challenging and high RF reflective environments,	
	Supports WIFI5, WPA2 enterprise encryption,	
	Push & Lock USB-C type microphone connector,	
	Dual 3.5 mm stereo jack sockets for headphones with single volume control,	
	Hot swap capable dual battery compartment,	
	Option for power the units via USB-C adapter,	
	Rechargeable lithium Ion battery	
	with long hours backup of 12hrs on single charge (included),	
	Certification: CE; BIS etc all complete	
	Submitted Product data sheet must be available in public domain	
37	Short Stem Removable 98MM microphone	
	Equipped with USB C-based push and lock connector,	
	Microphone Size: 97 × 33 × 33 mm,	
	Polar Pattern: Cardioid,	
	Max SPL @ 1kHz: 105 dB SPL or better,	
	Signal-to-noise ratio referred to 1 Pa: 74 dB or better,	
	Sensitivity @ 1 kHz : -35 dBV/Pa or better,	
	Frequency response: 125 to 15000 Hz or better,	
	Microphone with Ring Indicator to light up Red when active and Green when in Request,	
	USB-C-based microphone connector,	
	Connection: Push & Lock, Certification: CE etc all complete	
	Submitted Product data sheet must be available in public domain	
38	Advanced Audio License with the following functions and capabilities	
	Create new custom configurations,	
	Activate a prepared audio configuration, Edit, duplicate and delete a configuration,	

	Switch between existing configurations,	
	Visualize the various routing groups as a matrix,	
	Set routing options,	
	Manage all inputs and outputs (auxiliary and Dante levels),	
	Set mix minus and number of mix minus groups,	
	Route translation channels to Dante,	
	Select microphones or loudspeakers as always active for user input and output groups in customs configurations,	
	Set dynamics for all in-room delegates and Interpreter etc all complete	
	Submitted Product data sheet must be available in public domain	
39	Charging station	
	10 or more battery slots with charge process indication at a time - Charging time to full charge of only 2h,	
	LAN port. Rack mountable, 1U rack space,	
	Smart battery monitoring,	
	Built-in web based software with upgrade capabilities etc all complete	
	Submitted Product data sheet must be available in public domain	
40	Open Architecture Digital Signal Processor Type 1	
	4 Mic/Line Input with Phantom Power and 4 Line Outputs.	
	GPIO Ports - 8x8 or better.	
	AEC channels - 8 or more with 200ms tail length,	
	Minimum 8x8 Dante channels and support for up to 64x64 Network audio channels via Dante / AES67 or similar protocol,	
	SIP Softphone integration for Audio conferencing,	
	USB-B & C port supporting AV USB Bridging for software or web-based conferencing applications emulating USB Audio (Speakerphone) and USB Video (Camera) driver.	
	24 bit-A/D-D/A converters or better, 48 kHz Sample rate or better,	
	Input frequency response of 20 Hz to 20 kHz or better,	

	Input dynamic range > 109 dB or better.	
	RS232 Ports - 2 or more etc all complete	
	Submitted Product data sheet must be available in public domain	
41	Open Architecture Digital Signal Processor Type 2	
	Minimum 12 Mic/Line inputs and 12 Line outputs.	
	Shall support phantom power on each microphone input.	
	AEC channels - 16 or more with 200ms tail length for Analog and Networked Microphones.	
	Minimum 32x32 Dante channels and support for up to 128x128 Network audio channels via Dante /AES67 or similar protocol.	
	POTS and SIP Softphone integration for Audio conferencing.	
	USB-B port supporting AV USB Bridging for software or web-based conferencing applications emulating USB Audio (Speakerphone) and USB Video (Camera) driver.	
	24 bit-A/D-D/A converters or better,	
	48 kHz Sample rate or better,	
	Input frequency response of 20 Hz to 20 kHz or better,	
	Input dynamic range > 109 or better etc all complete	
	Submitted Product data sheet must be available in public domain	
42	Open Architecture flexible chassis based Digital Signal Processor	
	8 onboard I/O card slots ,	
	AV-to-USB Bridging solution and onboard acoustic echo cancellation (AEC) processing.	
	Audio I/O Capacity- 8 audio I/O card slots - accommodates up to 128x128 total onboard I/O channels,	
	256 x 256 Network Channel Capacity,	
	64 AEC Channel Capacity at 200 ms tail length,	
	In-built 16 Multi-track Player capacity & expandable to 128 tracks, 6 GB on board default Media drive capacity.	
	Front Panel monochrome OLED with capacitive touch buttons for settings.	

	Control and integrate external devices using TCP/IP, RS232 and GPIO,	
	with 8 Mic / Line Analog Input on Card,	
	8 Analog Line Output on Card,	
	Dante Audio Bridge Card with 64x64 channels at 48 kHz from any Dante edge network,	
	Analog Telephony Card & I/O-USB Bridge etc all complete	
	Submitted Product data sheet must be available in public domain	
43	Hardware or Software based control system	
	with required ports to control the devices mentioned in BOQ with perpetual licenses to connect Wall/Table mount touch screen controllers and iOS and Windows devices as wireless touch controller etc all complete	
44	Network I/O Expander	
	4 bi-directional RS232 serial ports,	
	One port includes RS422 and RS485 compatibility,	
	Power over Ethernet (PoE) capable,	
	Daisy-chain up to four expanders on a single network run etc all complete	
	Submitted Product data sheet must be available in public domain	
45	5" High Definition,	
	Projective capacitive Multi-touch Touch Screen Controller	
	24-bit colour display.	
	Viewable Screen Dimensions (diagonal) – 5-inch,	
	Resolution - 1280 × 720, Brightness - 450 Nits,	
	Aspect ratio – 16:9, Power – PoE,	
	Mounting – Wall and Tabletop,	
	Orientation - Vertical / horizontal. etc all complete	
	Submitted Product data sheet must be available in public domain	

46	10" High Definition, Multi-touch Touch Screen Controller	
	24-bit color display.	
	Viewable Screen Dimensions (diagonal) – 10.07-inch,	
	Resolution - 1920 × 1200, Brightness - 380 Nits,	
	Aspect ratio – 16:10,	
	Power – PoE, Mounting – Wall and Tabletop,	
	Orientation - Vertical / horizontal.	
	Configurable LEDs on both sides.	
	Sensors - Ambient Light Sensor,	
	Proximity Detection etc all complete	
	Submitted Product data sheet must be available in public domain	
47	8x1G PoE+ 110W 1x1G and 1xSFP Managed Switch	
	Number of Ports : 10 (8x 1G PoE+, 1x 1G, 1x SFP)	
	PoE Ports / Budget : 8 PoE+ (30W/port), 110W Budget	
	IGMP Support : Enhanced	
	Jumbo Frame Support : Yes, up to 12kb	
	AVB Support : Yes. Electronic license required, activation key sent via email	
	Acoustics : Fanless	
48	24x1G PoE+ 300W 2x1G and 4xSFP Managed Switch	
	Number of Ports : 30 (24x 1G PoE+, 2x 1G, 4x SFP)	
	PoE Ports / Budget : 24 PoE+ (30W/port), 300W Budget	
	IGMP Support : Enhanced	
	Jumbo Frame Support : Yes, up to 12kb	
	AVB Support : Yes. Electronic license required, activation key sent via email	
49	Column Surface-Mount Loudspeaker	

	Transducer 16 x 2.75 inch weather treated paper cone woofer or better.	
	Frequency Range 90 Hz – 17 kHz or better,	
	Rated Power 200 watts (rms) or better.	
	Sensitivity 89 dB (Narrow) 88 dB (Wide) Mode or better,	
	Coverage 160 x 15 (Narrow) / 30 (Wide) degrees or better,	
	Transformer Taps (70V / 100V): 120 / 60 / 30 Watt or better.	
	Ingress Protection IP54 or better,	
	Powder coated aluminium enclosure or similar.	
	Powder coated aluminium grille or similar.	
	Pan-Tilt mounting bracket should be included etc all complete	
	Submitted Product data sheet must be available in public domain	
50	6.5 inch Two Way Pendant-Mount Loudspeaker	
	Rated noise power 60 watts or more,	
	Frequency Range 55 Hz – 20 kHz,	
	Sensitivity 88 dB or more,	
	Rated coverage 135° conical DMT,	
	Maximum continuous SPL 106 dB or more,	
	Maximum peak SPL 112 dB or more,	
	Transformer Taps (70V / 100V): 60 / 30 / 15 Watt or better,	
	IP-34 or more Ingress protection,	
	Included mounting hardware: 3 Meter Two quick-link cable assemblies, two slip-lock fasteners, locking euro-block connector, sealable input cover and screws, snap-fit magnetic grille etc all complete	
	Submitted Product data sheet must be available in public domain	
51	Two-way, Ceiling-mount loudspeaker with back can	
	Continuous Power - minimum 30 Watts or better,	
	Sensitivity- minimum 89 dB SPL or better,	

	Coverage Angle -110° or less,	
	Maximum Peak SPL - minimum 110 dB or better,	
	Rated Impedance - 8 Ohms.	
	Transformer Tapping - 70V/100V(30,15,7.5watts) or better.	
	Transducers - LF - minimum 6.5-inch or better, HF- .86-inch coaxially mounted with LF or better,	
	Should include OEM supplied mounting brackets etc all complete	
	Submitted Product data sheet must be available in public domain	
52	8 Channel Class D Amplifier	
	200. Watt at 4 Ω , 8 Ω , 70 V or 100 V on each channel,	
	Flex-Amp Technology allows each pair of amplifier channels to deliver up to 400 W total power, in any ratio,	
	Frequency response at 8 Ω 20 Hz – 20 kHz +/- 0.5 dB,	
	Signal to Noise > 103 dB,	
	Input impedance >10k,	
	balanced or unbalanced,	
	UL, CE, RoHS / WEEE compliant etc all complete	
	Submitted Product data sheet must be available in public domain	
53	Quad Channel Class-D amplifier	
	Per Channel Power 60W @8 Ω /4 Ω or better.	
	Support for 70V/100V or more.	
	Power Sharing or Bridge/Parallel modes for better power distribution.	
	Frequency Response- 20 Hz – 20 kHz or better.	
	Signal to Noise ratio -> 103 dB or better,	
	Input impedance - >10k,	
	balanced or unbalanced or better,	
	Front and Rear panel indicators for Power, signal (per channel), limit / mute / protect etc. or better.	

	Better to have Remote standby and Power saving features - Auto-standby	
	Submitted Product data sheet must be available in public domain	
54	1, 2 & 3 Meter Premium High Speed HDMI 2.0b flexy cable	
	Bandwidth up to 18Gbps,	
	Up to 4096 x 2160 @ 60Hz at RGB 4:4:4 video resolution,	
	Support High Dynamic Range (HDR10),	
	Dolby Vision and Hybrid log-gamma (HLG) video,	
	Consumer Electronics Control (CEC),	
	Audio Return Channel (ARC) and	
	HDMI Ethernet Channel (HEC) etc all complete	
	Submitted Product data sheet must be available in public domain	
55	5 Meter Premium High Speed HDMI 2.0b Premium cable	
	Bandwidth up to 18Gbps,	
	Up to 4096 x 2160 @ 60Hz at RGB 4:4:4 video resolution,	
	Support High Dynamic Range (HDR10),	
	Dolby Vision and Hybrid log-gamma (HLG) video,	
	Consumer Electronics Control (CEC),	
	Audio Return Channel (ARC) and	
	HDMI Ethernet Channel (HEC) etc all complete	
	Submitted Product data sheet must be available in public domain	
56	10 & 15 Meter Premium High-Speed HDMI 2.0b Hybrid Optical Active Cable	
	Bandwidth up to 18Gbps,	
	Up to 4096 x 2160 @ 60 Hz at RGB 4:4:4 video resolution,	
	Supports EDID, HDCP2.2, HDR, CEC, ARC etc all complete	
	Submitted Product data sheet must be available in public domain	

57	2 Meter Full-featured Type-C ProAV cable	
	4K Video; USB 2.0 & 3.2 Gen 2x2 Data;	
	100W/5A PD Charging,	
	4 Lane DisplayPort Alt mode (4K60FPS Video and Audio),	
	USB3.2 Gen 2x2 20Gbps (10Gbps/lane)	
	"SuperSpeed Plus" (4K Webcam, SSD storage) etc all complete	
	Submitted Product data sheet must be available in public domain	
58	10 Meter HUSB 3.1 Gen1 SuperSpeed Active Extension Cable	
	Type A /male to Type A /female,	
	Native USB2 / USB1 and USB3 extension,	
	Supporting peripherals via USB 2.0 up to 480 Mbps (Mouse, Keyboard, Thumb Drive, Speakerphone and Webcam),	
	Plug and play compatible with PC, Mac, and Linux etc all complete	
	Submitted Product data sheet must be available in public domain	
59	4 x 4 USB 3.2 Gen 1 Industrial Hub Switch etc all complete	
60	Microphone Cable,	
	2 Conductor 22 AWG Tinned Copper, PE Insulation, 85% Tinned Copper Braid Shield, Cotton Braid, PVC Jacket (as per actual) etc all complete	
	Submitted Product data sheet must be available in public domain	
61	14 AWG Speaker Cable	
	Stranded Bare copper conductors, PVC / Nylon insulation, PVC jacket (as per actual) etc all complete	
	Submitted Product data sheet must be available in public domain	
62	Cat 6 STP Cable (as per actual) etc all complete	

63	Connector and Accessories (such as USB Patch cord cable, USB-HUB, USB-C to HDMI Adaptor etc) etc all complete	
64	Rack Structure 24 U	
	Air Cooled AV Equipment Rack with 4 Nos. of Vertical Power Strips, Cantilever Selves, Cable routing perforations, 4 No. of Spin Wheels etc all complete	

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