

	<p>भारतीय प्रौद्योगिकीसंस्थानमद्रासचेन्नै 600 036  <b>INDIAN INSTITUTE OF TECHNOLOGY MADRAS Chennai 600 036</b>  भंडार एवं क्रय अनुभाग  <b>STORES &amp; PURCHASE SECTION</b>  Email: <a href="mailto:adstores@iitm.ac.in">adstores@iitm.ac.in</a>  दूरभाष: (044) 2257 8285 / 8286 / 8287 / 8288 फ़ैक्स: (044) 2257 8292  Telephone : (044) 2257 8285/8286/8287/8288 FAX: (044) 2257 8292  GSTIN: 33AAAAI3615G1Z6</p>	
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**BOOMA SOWRIRAJAN**

*Assistant Registrar (Stores & Purchase)*

**Date: 10.05.2021**

**CORRIGENDUM - VI**

**“SUPPLY, INSTALLATION AND COMMISSIONING OF AUDIO AND VIDEO CONFERENCING SYSTEM  
IN BOARD ROOM of IIT MADRAS AS PER DESIGN”**

Tender No. IITM/SPS/AV System/001/2021-22

e-Tender ID: 2021\_IITM\_75180\_1

**1. In Page No. 10, (C) – Bill of Material – Sl. No. 6 may be read as**

Sl.No	Description	Make	UoM	Qty
6	<b>52 port Layer 3 Managed 1 or above Gigabit Switch</b>	CISCO/EXTREME	No.	1
<b>Instead of</b>				
6	Layer 3 Managed Gigabit Switch	CISCO/EXTREME	No.	1

**2. In Page No. 12 & 13 (D) – Detailed Technical Specification – Sl. No. 3 – Wireless Presenter may be read as**

Item Reference	3
Item Description	Wireless Presenter
Make/Brand	CRESTRON/EXTRON/KRAMER
<b>Minimum Performance Parameters</b>	
Ethernet	100 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1x, Active Directory authentication, HTTPS web browser setup, 802.3af and 802.3at Type 1 compliant
RS-232 / <b>Optional</b>	2-way display device control up to 115.2k baud with hardware and software handshaking
IR/Serial/ <b>Optional</b>	1-way display device control via infrared up to 1.1 MHz or serial TTL/RS-232 (0-5V)
HDMI Input	HDCP 1.4, EDID; Should supports management of HDCP and EDID
OS Support	Apple® iOS®, Android™, Windows® 7, Windows 8, Windows 10, macOS®, Chrome OS™
Video Frame Rate	Up to 30 fps or higher, audio supported
<b>Output Resolutions</b>	<b>1280x720@50Hz (720p50), 1280x720@60Hz (720p60), 1280x800@60Hz, 1366x768@60Hz, 1920x1080@50Hz (1080p50), 1920x1080@60Hz (1080p60)</b>
Bitrate Peak/ <b>Optional</b>	0.25 to 8.5 Mbps or higher, variable depending on content complexity
Bitrate Average/ <b>Optional</b>	1.4 Mbps typical
Audio Format	Stereo
Input Signal Types	"Wireless Input, HDMI (DVI & Dual-Mode DisplayPort™ compatible3);
Output Signal Types	Simultaneous display of two sources, Should be able to adjust the screen orientation when present from mobile device
Maximum Input Resolution	HDMI (DVI compatible3)

Background & Logo File Support	"1920x1080@60Hz (HD 1080p60), 4:4:4,
Output Signal Type/ <b>Optional</b>	36 bit color depth"
<b>Connection</b>	
HDMI INPUT	HDMI Type A connector, female; HDMI digital video/audio input; (DVI & Dual-Mode DisplayPort compatible3)
HDMI OUTPUT	HDMI Type A connector, female; HDMI digital video/audio output; (DVI compatible)
USB	USB Type A connector, female
LAN PoE	8-pin RJ-45 connector, female; 100Base-TX Ethernet port and PoE PD port
<b>Instead of</b>	
Item Reference	3
Item Description	Wireless Presenter
Make/Brand	CRESTRON/EXTRON/KRAMER
<b>Minimum Performance Parameters</b>	
Ethernet	100 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1x, Active Directory authentication, HTTPS web browser setup, 802.3af and 802.3at Type 1 compliant
RS-232	2-way display device control up to 115.2k baud with hardware and software handshaking
IR/Serial	1-way display device control via infrared up to 1.1 MHz or serial TTL/RS-232 (0-5V)
HDMI Input	HDCP 1.4, EDID; Should supports management of HDCP and EDID
OS Support	Apple® iOS®, Android™, Windows® 7, Windows 8, Windows 10, macOS®, Chrome OS™
Video Frame Rate	Up to 30 fps or higher, audio supported
Output Resolutions	640x480@60Hz, 800x600@60Hz, 1024x768@60Hz, 1280x720@50Hz (720p50), 1280x720@60Hz (720p60), 1280x800@60Hz, 1366x768@60Hz, 1440x900@60Hz, 1600x900@60Hz, 1600x1200@60Hz, 1680x1050@60Hz, 1920x1080@50Hz (1080p50), 1920x1080@60Hz (1080p60), Up to 4K: 4:4:4 / 4k UHD
Bitrate Peak	0.25 to 8.5 Mbps or higher, variable depending on content complexity
Bitrate Average	1.4 Mbps typical
Audio Format	Stereo
Input Signal Types	"Wireless Input, HDMI (DVI & Dual-Mode DisplayPort™ compatible3);
Output Signal Types	Simultaneous display of two sources, Should be able to adjust the screen orientation when present from mobile device
Maximum Input Resolution	HDMI (DVI compatible3)
Background & Logo File Support	"1920x1080@60Hz (HD 1080p60), 4:4:4,
Output Signal Type	36 bit color depth"
<b>Connection</b>	
Console	Micro-USB Type B connector, female / USB 2.0 device port for computer console (installer setup)
IR	4-pin 3.5 mm detachable terminal block; IR/Serial output port for display device control; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud

COM	5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port for display device control; Up to 115.2k baud, hardware and software handshaking support
HDMI INPUT	HDMI Type A connector, female; HDMI digital video/audio input; (DVI & Dual-Mode DisplayPort compatible <sup>3</sup> )
HDMI OUTPUT	HDMI Type A connector, female; HDMI digital video/audio output; (DVI compatible)
USB	USB Type A connector, female
LAN PoE	8-pin RJ-45 connector, female; 100Base-TX Ethernet port and PoE PD port
24VDC 0.75A	2.1 x 5.5 mm DC power connector/equivalent
	24VDC power input ( Should include in the Box, If not can be added separate )
Ground	6-32 screw / equivalent
	Chassis ground lug / equivalent

**3. In Page No. 13 & 14, (D) – Detailed Technical Specification – Sl. No. 4 – AV Over IP Decoder may be read as**

Item Reference	4
Item Description	AV Over IP Decoder with scaler
Make/Brand	CRESTRON/EXTRON/KRAMER
<b>Minimum Performance Parameters</b>	
Decoding	
Video Codec	Pixel Perfect Processing / processing which support 4K60, 4:4:4, and HDR flawless video transport
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10, HDR10+, Dolby Vision®, and Deep Color support
<b>Audio Formats</b>	<b>Primary multichannel</b>
<b>Bit Rates/Optional</b>	200 to 850 Mbps or higher
Streaming Protocols	RTP, SDP
<b>Session Initiation</b>	<b>Multicast via secure RTSP / UDP</b>
<b>Copy Protection</b>	<b>HDCP 2.2 or optional AES-128, PKI</b>
Video	
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support <sup>1</sup> (DVI compatible <sup>6</sup> )
<b>Copy Protection</b>	<b>HDCP 2.2 / Above</b>
Audio	
Input Signal Types	HDMI (Dual-Mode Display Port interface compatible)
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Communications	
Ethernet	8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port; 2 PoE+ PD (powered device) port, IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant;
HDMI OUTPUT	HDMI Type A connector, female; HDMI digital video/audio output <sup>1</sup> (DVI compatible <sup>6</sup> )
<b>IR 1 – 2</b>	<b>IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5 V) up to 19200 baud; detachable terminal block; Bidirectional RS-232 port;</b>
COM	Up to 115.2k baud, hardware and software handshaking support
<b>Instead of</b>	
Item Reference	4
Item Description	AV Over IP Decoder with scaler
Make/Brand	CRESTRON/EXTRON/KRAMER

Minimum Performance Parameters	
Decoding	
Video Codec	Pixel Perfect Processing / processing which support 4K60, 4:4:4, and HDR flawless video transport
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10, HDR10+, Dolby Vision®, and Deep Color support
Audio Formats	Primary multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	200 to 850 Mbps or higher
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.2, AES-128, PKI
Video	
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support1 (DVI compatible6)
Copy Protection	HDCP 2.2
Audio	
Input Signal Types	HDMI (Dual-Mode Display Port interface compatible)
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-To-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz $\pm 0.5$ dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz;
	Stereo Separation: >90 dB
Analog Output Volume Adjustment	-80 to +20 dB
Communications	
Ethernet	8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port; 2 PoE+ PD (powered device) port, IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant;
HDMI OUTPUT	HDMI Type A connector, female; HDMI digital video/audio output1 (DVI compatible6)
AUDIO	5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output3; Output Impedance: 200 Ohms balanced, 100 Ohms unbalanced; Maximum Output Level: 4 Vrms balanced, 2 Vrms unbalanced
CONSOLE, USB	Micro USB connector, female; USB 2.0 computer console port (for setup)
IR 1 – 2	4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5 V) up to 19200 baud; 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port;
COM	Up to 115.2k baud, hardware and software handshaking support
24VDC 2.0A	2.1 x 5.5 mm DC power connector/ equivalent
	24 VDC power input ( Should Included in the Box, If not can be added separate )
Ground	6-32 screw / equivalent
	Chassis ground lug / equivalent

**4. In Page No. 14 & 15, (D) – Detailed Technical Specification – Sl. No. 5 – AV Over IP Encoder may be read as**

Item Reference	5
Item Description	AV Over IP Encoder

Make/Brand	CRESTRON/EXTRON/KRAMER
<b>Minimum Performance Parameters</b>	
<b>Encoding</b>	
Video Codec	Pixel Perfect Processing / processing which support 4K60, 4:4:4, and HDR flawless video transport
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10, HDR10+, Dolby Vision®, and Deep Color support
<b>Audio Formats</b>	<b>Primary multichannel</b>
Bit Rates/ <b>Optional</b>	200 to 950 Mbps
Streaming Protocols	RTP, SDP
Session Initiation	Multicast via secure RTSP
<b>Copy Protection</b>	<b>HDCP 2.2 or Optional AES-128, PKI</b>
<b>Video</b>	
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support1 (DVI compatible6)
<b>Copy Protection</b>	<b>HDCP 2.2 / Above</b>
<b>Audio</b>	
Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible7
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
<b>Communications</b>	
Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;2 PoE+ PD (powered device) port,IEEE 802.3at Type 2 PoE+
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output1 (DVI compatible6)
<b>AUDIO/ Optional</b>	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE browser setup and control
<b>CONSOLE, USB / Optional</b>	USB 2.0 computer console (for setup)
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and `software handshaking (via control system); computer console (for setup) (1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports;
<b>IR/Serial</b>	<b>IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5 V) up to 19200 baud; detachable terminal block; Bidirectional RS-232 port;</b>
<b>COM</b>	<b>Up to 115.2k baud, hardware and software handshaking support</b>
HDMI	HDCP 2.2, EDID, CEC
<b>Instead of</b>	
Item Reference	5
Item Description	AV Over IP Encoder
Make/Brand	CRESTRON/EXTRON/KRAMER
<b>Minimum Performance Parameters</b>	
<b>Encoding</b>	
Video Codec	Pixel Perfect Processing / processing which support 4K60, 4:4:4, and HDR flawless video transport
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10, HDR10+, Dolby Vision®, and Deep Color support
Audio Formats	Primary multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	200 to 950 Mbps
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)

Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.2, AES-128, PKI
Video	
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support <sup>1</sup> (DVI compatible <sup>6</sup> )
Copy Protection	HDCP 2.2
Audio	
Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible <sup>7</sup> )
Digital Formats	Dolby Digital <sup>®</sup> , Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS <sup>®</sup> , DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-To-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz $\pm 0.5$ dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz;
	Stereo Separation: >90 dB
Analog Output Volume Adjustment	-80 to +20 dB
Communications	
Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port; 2 PoE+ PD (powered device) port, IEEE 802.3at Type 2 PoE+
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output <sup>1</sup> (DVI compatible <sup>6</sup> )
AUDIO	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE browser setup and control
CONSOLE, USB	USB 2.0 computer console (for setup)
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking (via control system); computer console (for setup) (1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports;
IR/Serial	IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5 V) up to 19200 baud;
COM	1-way device control via infrared up to 1.1 MHz or serial TTL/RS-232 (0-5 V)
HDMI	HDCP 2.2, EDID, CEC

**5. In Page No. 15&16, (D) – Detailed Technical Specification – Sl. No. 6 – Layer 3 Managed Gigabit Switch may be read as**

Item Reference	6
Item Description	<b>52 port Layer 3 Managed 1 or above Gigabit Switch</b>
Make/Brand	CISCO/EXTREME
Minimum Performance Parameters	
USB slot	
Spanning Tree Protocol	Standard 802.1d Spanning Tree support; Fast convergence using 802.1w (Rapid Spanning Tree [RSTP]), enabled by default; 8 instances should be supported; Multiple Spanning Tree instances using 802.1s (MSTP)
Port grouping	Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP) <ul style="list-style-type: none"> <li>● Up to 8 groups</li> <li>● Up to 8 ports per group with 16 candidate ports for each (dynamic) 802.3ad link aggregation</li> </ul>

Multicast TV VLAN	Multicast TV VLAN allows the single multicast VLAN to be shared in the network while subscribers remain in separate VLANs (also known as MVR)
Secure Shell (SSH) Protocol	SSH is a secure replacement for Telnet traffic. SCP also uses SSH. SSH v1 and v2 are supported
Web user interface	Built-in switch configuration utility for easy browser-based device configuration (HTTP/HTTPS). Supports configuration, system dashboard, system maintenance, and monitoring.
<b>Instead of</b>	
Item Reference	6
Item Description	Layer 3 Managed Gigabit Switch
Make/Brand	CISCO/EXTREME
<b>Minimum Performance Parameters</b>	
USB slot	
Spanning Tree Protocol	Standard 802.1d Spanning Tree support; Fast convergence using 802.1w (Rapid Spanning Tree [RSTP]), enabled by default; 8 instances should be supported; Multiple Spanning Tree instances using 802.1s (MSTP)
Port grouping	Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP) <ul style="list-style-type: none"> <li>Up to 8 groups</li> <li>Up to 8 ports per group with 16 candidate ports for each (dynamic) 802.3ad link aggregation</li> </ul>
Multicast TV VLAN	Multicast TV VLAN allows the single multicast VLAN to be shared in the network while subscribers remain in separate VLANs (also known as MVR)
Secure Shell (SSH) Protocol	SSH is a secure replacement for Telnet traffic. SCP also uses SSH. SSH v1 and v2 are supported
Web user interface	Built-in switch configuration utility for easy browser-based device configuration (HTTP/HTTPS). Supports configuration, system dashboard, system maintenance, and monitoring.
Power	740 W Dedicated PoE Power

**6. In Page No. 16, (D) – Detailed Technical Specification – Sl. No. 7 – USB 2.0 Extender may be read as**

Item Reference	7
Item Description	USB 2.0 Extender
Approved Make/Brand	CRESTRON/ICRON/EXTRON
<b>Minimum Performance Parameters</b>	
<b>Communications</b>	
Link	USB extension up to 100 m (330 ft) over solid-core CAT5e (or better) unshielded twisted pair (UTP) cable <sup>2</sup>
USB Device Support	USB 1.0/1.1 and 2.0 compatible including mass storage and isochronous devices <sup>1</sup>
USB Hub Support/ <b>Optional</b>	Any signal chain may include up to 4 USB hubs plus
Maximum USB Devices/ <b>Optional</b>	30 USB devices, or 4 USB hubs with 26 USB devices
Host Computer OS Support	Windows®, macOS®, and Linux® operating systems
<b>USB Throughput</b>	<b>USB 2.0 up to 480 Mbps / USB 1.1 up to 12 Mbps</b>
<b>Connectors – Local endpoint</b>	
Link	8-pin RJ45 connector, female; Connects directly to a Remote extender <sup>2</sup>
USB	USB Type B connector, female; USB 2.0 device port for connection to the USB host computer, media server, game console, annotator, codec, etc.
<b>Connectors – Remote endpoint</b>	
Link	8-pin RJ45 connector, female; should connects to Link port on the Local endpoint

<b>USB</b>	<b>USB Type A connectors, female; USB 2.0 host ports for connection of USB devices such as mice, keyboards, and other USB devices</b>
<b>Instead of</b>	
Item Reference	7
Item Description	USB 2.0 Extender
Approved Make/Brand	CRESTRON/ICRON/EXTRON
<b>Minimum Performance Parameters</b>	
<b>Communications</b>	
Link	USB extension up to 100 m (330 ft) over solid-core CAT5e (or better) unshielded twisted pair (UTP) cable <sup>2</sup>
USB Device Support	USB 1.0/1.1 and 2.0 compatible including mass storage and isochronous devices <sup>1</sup>
USB Hub Support	Any signal chain may include up to 4 USB hubs plus
Maximum USB Devices	30 USB devices, or 4 USB hubs with 26 USB devices
Host Computer OS Support	Windows®, macOS®, and Linux® operating systems
USB Throughput	USB 2.0 up to 480 Mbps, USB 1.1 up to 12 Mbps
<b>Connectors – Local endpoint</b>	
Power	2.1 x 5.5 mm DC power connector; 24 V, 1A DC power input (power supply included)
Link	8-pin RJ45 connector, female; Connects directly to a Remote extender <sup>2</sup>
USB	USB Type B connector, female; USB 2.0 device port for connection to the USB host computer, media server, game console, annotator, codec, etc.
<b>Connectors – Remote endpoint</b>	
Power	2.1 x 5.5 mm DC power connector; 24 V, 1A DC power input
Link	8-pin RJ45 connector, female; Should connects to Link port on the Local endpoint
USB	USB Type A connectors, female; USB 2.0 host ports for connection of USB devices such as mice, keyboards, and other USB devices Available USB Power: 1 A maximum per port, 1.5 A maximum total

**7. In Page No. 16 & 17, (D) – Detailed Technical Specification – Sl. No. 8 – Unified Conference Bundle may be read as**

Item Reference	8
Item Description	Unified Conference Bundle
Approved Make/Brand	CRESTRON/POLY/Equivalent
<b>Minimum Performance Parameters</b>	
<b>Tabletop Touch Screen</b>	
<b>Touch Screen</b>	<b>8" or above diagonal capacitive multi-touch TFT active matrix color LCD, 1920 x 1200 pixels, 400 nits Brightness, 1000:1 Contrast Ratio, 24 bit and 16.7M Color depth, 5 Point Multi Touch Capable</b>
<b>UC Client (This is the Stated Requirement, However Integrator can quote additional components to enable this feature when using polycom or other equivalent MS Teams Room System)</b>	Microsoft Teams Rooms with Skype® for Business software functionality with USB pass through for other UC calls
<b>Instead of</b>	
Item Reference	8
Item Description	Unified Conference Bundle



Approved Make/Brand	CRESTRON/POLY/Equivalent
Minimum Performance Parameters	
Tabletop Touch Screen	
Touch Screen	10.1 in. (257 mm) diagonal capacitive multi-touch TFT active matrix color LCD, 1920 x 1200 pixels, 400 nits Brightness, 1000:1 Contrast Ratio, 24 bit and 16.7M Color depth, 5 Point Multi Touch Capable
UI	Microsoft Teams UI plus optional Smart Graphics room control
Ethernet	100 Mbps, auto switching, auto negotiating, auto discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, SNMP, IPv4 or IPv6, Active Directory® service authentication, HTTPS web browser setup
Power over Ethernet	IEEE 802.3at Type 2 compliant PoE+ PD (Powered Device); Should provide 15 W from an 802.3at Type 2 PSE with LLDP advanced power management; Should provide 18 W from an 802.3at Type 2 PSE with LLDP; Should provide 30 W (PoE+ Class 4) from an 802.3at Type 2 PSE without LLDP; Should provide 15.4 W (PoE Class 0) from an 802.3af (or 802.3at Type 1) PSE
PoE Injector	A PoE injector should be included to power the touch screen if network PoE is not available
UC Bracket Assembly	
Mini PC	Intel Core® processor with Windows® 10 IOT Edition OS
UC Client	Microsoft Teams Rooms with Skype® for Business software functionality with USB pass through for other UC calls
Content Ingest	HDMI input via HDMI to USB 3.0 converter
Display Output	Single display support
Display Output Resolution	1080p
Power	65 W via external 100-240 VAC, 50 Hz adapter (included)
Construction	Metal mounting bracket, black, preassembled
Mounting	Surface wall mount behind the display device, or attach to the rear of the display device via the bolts attaching the display to a display mount; Bracket includes mounting holes on both side edges, spaced 100, 200, and 300 mm vertically, to allow for attachment to either side of the display mounting plate

**8. In Page No. 19 & 20, (D) – Detailed Technical Specification – Sl. No. 15 – Control Processor may be read as**

Item Reference	15
Item Description	Control Processor
Approved Make/Brand	CRESTRON/EXTRON/KRAMER
Minimum performance parameters	
Communications	
Ethernet	<b>100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, industry-standard TCP/IP stack, UDP/IP, DHCP, IPv4, Active Directory® service authentication, HTTPS web server, HTTPS web browser setup</b>
USB / Optional	Should Support USB mass storage class devices via the rear panel USB 2.0 host port, supports computer console via the front panel USB 2.0 device port
RS-232/422/485	<b>For 2-way device control and monitoring, COM port should support RS-232 up to 115.2k baud with software handshaking</b>
IR/Serial/ <b>Optional</b>	Should support 1-way device control via infrared up to 1.2 MHz or serial TTL/RS-232 (0–5V) up to 115.2k baud
Memory	
SDRAM/ <b>Optional</b>	2 GB / 512 MB
Flash/ <b>Optional</b>	8 GB / 4.5 GB

Memory Card/ <b>Optional</b>	Should support SD and SDHC cards up to 32 GB
External Storage/ <b>Optional</b>	Should Support USB mass storage devices up to 1 TB
Connectors	
<b>RELAY OUTPUT 1–4</b>	<b>Minimum of 4 Relay ports with 3.5 mm detachable terminal block; Should comprise normally open, isolated relays; Rated 1 A, 30 VAC/VDC; MOV arc suppression across contacts</b>
I/O 1–4	Minimum of 4 I/O ports with 3.5 mm detachable terminal block; Should comprises (4) Versiport digital input/output or analog input ports (referenced to GND); Digital Input: Rated for 0–24 VDC, input impedance 20k $\Omega$ , logic threshold >3.125 V low/0 and <1.875 V high/1; Digital Output: 250 mA sink from maximum 24 VDC, catch diodes for use with real world loads; Analog Input: Rated for 0–10 VDC, protected to 24 VDC maximum, input impedance 21k $\Omega$ with pull-up resistor disabled; Programmable 5 V, 2k $\Omega$ pull-up resistor per pin
<b>IR - SERIAL OUTPUT 1–4</b>	<b>Minimum of 4 IR Ports 3.5 mm detachable terminal blocks; Should comprises (4) IR output ports;</b>
<b>COM 1</b>	<b>3 pin or 5 pin 3.5 mm detachable terminal block; Bidirectional RS-232 ports; Up to 115.2k baud; Software handshaking support</b>
COM 2–3	3-pin 3.5 mm detachable terminal blocks; Bidirectional RS-232 ports; Up to 115.2k baud; software handshaking support
<b>MEMORY/ Optional</b>	SD memory card slot; Accepts one SD or SDHC card up to 32 GB for storage of log files
<b>USB</b>	<b>USB Type A connector, female / Optional USB 2.0 port for storage devices</b>
LAN	8-pin RJ45 connector, female; 100/1000Base-TX Ethernet port
CONTROL SUBNET / OPTIONAL	8-pin RJ45 connector, female; 100/1000Base-TX Ethernet port;
<b>Instead of</b>	
Item Reference	15
Item Description	Control Processor
Approved Make/Brand	CRESTRON/EXTRON/KRAMER
<b>Minimum performance parameters</b>	
Communications	
Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, industry-standard TCP/IP stack, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), FIPS 140-2 compliant encryption, IEEE 802.1x, SNMP, BACnet™ and IP1, IPv4 or IPv6, Active Directory® service authentication, HTTPS web server, HTTPS web browser setup
USB / Optional	Should Support USB mass storage class devices via the rear panel USB 2.0 host port, supports computer console via the front panel USB 2.0 device port
RS-232/422/485	For 2-way device control and monitoring, COM port should support RS-232 up to 115.2k baud with software handshaking, one port also should support RS-422 or RS-485 and hardware handshaking
IR/Serial	Should support 1-way device control via infrared up to 1.2 MHz or serial TTL/RS-232 (0–5 V) up to 115.2k baud

Memory	
SDRAM	2 GB / 512 MB
Flash	8 GB / 4.5 GB
Memory Card	Should support SD and SDHC cards up to 32 GB
External Storage	Should Support USB mass storage devices up to 1 TB
Connectors	
RELAY OUTPUT 1–4	Minimum of 4 Relay ports with 3.5 mm detachable terminal block; Should comprise (8) normally open, isolated relays; Rated 1 A, 30 VAC/VDC; MOV arc suppression across contacts
I/O 1–4	Minimum of 4 I/O ports with 3.5 mm detachable terminal block; Should comprises (4) Versiport digital input/output or analog input ports (referenced to GND); Digital Input: Rated for 0–24 VDC, input impedance 20k $\Omega$ , logic threshold >3.125 V low/0 and <1.875 V high/1; Digital Output: 250 mA sink from maximum 24 VDC, catch diodes for use with real world loads; Analog Input: Rated for 0–10 VDC, protected to 24 VDC maximum, input impedance 21k $\Omega$ with pull-up resistor disabled; Programmable 5 V, 2k $\Omega$ pull-up resistor per pin
IR - SERIAL OUTPUT 1–4	Minimum of 4 IR Ports 3.5 mm detachable terminal blocks; Should comprises (4) IR output ports; IR output up to 1.2 MHz; 1-way serial TTL/RS-232 (0–5 V) up to 115.2k baud
COM 1	5-pin 3.5 mm detachable terminal block; Bidirectional RS-232/422/485 port; Up to 115.2k baud; hardware and software handshaking support
COM 2–3	3-pin 3.5 mm detachable terminal blocks; Bidirectional RS-232 ports; Up to 115.2k baud; software handshaking support
MEMORY	SD memory card slot; Accepts one SD or SDHC card up to 32 GB for storage of log files
USB	USB Type A connector, female; USB 2.0 port for storage devices
LAN	8-pin RJ45 connector, female; 100/1000Base-TX Ethernet port
CONTROL SUBNET / OPTIONAL	8-pin RJ45 connector, female; 100/1000Base-TX Ethernet port;
COMMUNICATION BUS	4-pin 3.5 mm detachable terminal block; Network master port; Outputs power to Network devices only if the included power pack is connected to the 24 VDC power input jack; Alternately functions as a Network power input to power the unit from a Network power supply / eBUS control ports - eBUS pin configuration
Power / Equivalent	2.1 x 5.5 mm DC power connector / equivalent; 24 V, 2A DC power input; Passes through to the NET port to power Network devices;
Ground	6-32 screw; Chassis ground lug / equivalent
COMPUTER (front)	USB Type B connector, female; USB 2.0 computer console port;
Features/Optional	Should be able to run 10 Programs simultaneously

**9. In Page No. 32 &33, (B) –Technical Specification sheet for Audio and Video Conferencing System –**

**Sl. No. 3 – Wireless Presenter may be read as**

Name of the Make/Brand and Model No		Make /Brand Name :
		Model No
Description	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.
<b>Minimum Performance Parameters.</b>		
Ethernet	100 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1x, Active Directory authentication, HTTPS web browser setup, 802.3af and 802.3at Type 1 compliant	
RS-232 / <b>Optional</b>	2-way display device control up to 115.2k baud with hardware and software handshaking	
IR/Serial/ <b>Optional</b>	1-way display device control via infrared up to 1.1 MHz or serial TTL/RS-232 (0-5V)	
HDMI Input	HDCP 1.4, EDID; Should supports management of HDCP and EDID	
OS Support	Apple® iOS®, Android™, Windows® 7, Windows 8, Windows 10, macOS®, Chrome OS™	
Video Frame Rate	Up to 30 fps or higher, audio supported	
<b>Output Resolutions</b>	<b>1280x720@50Hz (720p50), 1280x720@60Hz (720p60), 1280x800@60Hz, 1366x768@60Hz, 1920x1080@50Hz (1080p50), 1920x1080@60Hz (1080p60)</b>	
Bitrate Peak/ <b>Optional</b>	0.25 to 8.5 Mbps or higher, variable depending on content complexity	
Bitrate Average/ <b>Optional</b>	1.4 Mbps typical	
Audio Format	Stereo	
Input Signal Types	"Wireless Input, HDMI (DVI & Dual-Mode DisplayPort™ compatible3);	
Output Signal Types	Simultaneous display of two sources, Should be able to adjust the screen orientation when present from mobile device	
Maximum Input Resolution	HDMI (DVI compatible3)	
Background & Logo File Support	"1920x1080@60Hz (HD 1080p60), 4:4:4,	
Output Signal Type/ <b>Optional</b>	36 bit color depth"	
<b>Connection</b>		
HDMI INPUT	HDMI Type A connector, female; HDMI digital video/audio input; (DVI & Dual-Mode DisplayPort compatible3)	
HDMI OUTPUT	HDMI Type A connector, female; HDMI digital video/audio output; (DVI compatible)	
USB	USB Type A connector, female	
LAN PoE	8-pin RJ-45 connector, female; 100Base-TX Ethernet port and PoE PD port	
<b>Instead of</b>		
Name of the Make/Brand and Model No		Make /Brand Name :
		Model No
Description	Compliance	Details of Catalogue/

		(Yes/No)	Data Sheet Proof with Page No in the tender document.
<b>Minimum Performance Parameters.</b>			
Ethernet	100 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1x, Active Directory authentication, HTTPS web browser setup, 802.3af and 802.3at Type 1 compliant		
RS-232	2-way display device control up to 115.2k baud with hardware and software handshaking		
IR/Serial	1-way display device control via infrared up to 1.1 MHz or serial TTL/RS-232 (0-5V)		
HDMI Input	HDCP 1.4, EDID; Should supports management of HDCP and EDID		
OS Support	Apple® iOS®, Android™, Windows® 7, Windows 8, Windows 10, macOS®, Chrome OS™		
Video Frame Rate	Up to 30 fps or higher, audio supported		
Output Resolutions	640x480@60Hz, 800x600@60Hz, 1024x768@60Hz, 1280x720@50Hz (720p50), 1280x720@60Hz (720p60), 1280x800@60Hz, 1366x768@60Hz, 1440x900@60Hz, 1600x900@60Hz, 1600x1200@60Hz, 1680x1050@60Hz, 1920x1080@50Hz (1080p50), 1920x1080@60Hz (1080p60), Up to 4K: 4:4:4 / 4k UHD		
Bitrate Peak	0.25 to 8.5 Mbps or higher, variable depending on content complexity		
Bitrate Average	1.4 Mbps typical		
Audio Format	Stereo		
Input Signal Types	"Wireless Input, HDMI (DVI & Dual-Mode DisplayPort™ compatible3);		
Output Signal Types	Simultaneous display of two sources, Should be able to adjust the screen orientation when present from mobile device		
Maximum Input Resolution	HDMI (DVI compatible3)		
Background & Logo File Support	"1920x1080@60Hz (HD 1080p60), 4:4:4,		
Output Signal Type	36 bit color depth"		
<b>Connection</b>			
Console	Micro-USB Type B connector, female / USB 2.0 device port for computer console (installer setup)		
IR	4-pin 3.5 mm detachable terminal block; IR/Serial output port for display device control; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud		
COM	5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port for display device control; Up to 115.2k baud, hardware and software handshaking support		
HDMI INPUT	HDMI Type A connector, female; HDMI digital video/audio input; (DVI & Dual-Mode DisplayPort compatible3)		
HDMI OUTPUT	HDMI Type A connector, female; HDMI digital video/audio output; (DVI compatible)		
USB	USB Type A connector, female		
LAN PoE	8-pin RJ-45 connector, female; 100Base-TX Ethernet		

	port and PoE PD port		
24VDC 0.75A	2.1 x 5.5 mm DC power connector/equivalent		
	24VDC power input ( Should include in the Box, If not can be added separate )		
Ground	6-32 screw / equivalent		
	Chassis ground lug / equivalent		

**10.In Page No. 34 & 35, (B) –Technical Specification sheet for Audio and Video Conferencing System –  
SI. No. 4 – AV Over IP Decoder may be read as**

Name of the Make/Brand and Model No		Make /Brand Name :	
		Model No	
Description		Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.
Minimum Performance Parameters.			
Decoding			
Video Codec	Pixel Perfect Processing / processing which support 4K60, 4:4:4, and HDR flawless video transport		
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10, HDR10+, Dolby Vision®, and Deep Color support		
<b>Audio Formats</b>	<b>Primary multichannel</b>		
Bit Rates/ <b>Optional</b>	200 to 850 Mbps or higher		
Streaming Protocols	RTP, SDP		
<b>Session Initiation</b>	<b>Multicast via secure RTSP / UDP</b>		
<b>Copy Protection</b>	<b>HDCP 2.2 or optional AES-128, PKI</b>		
Video			
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support1 (DVI compatible6)		
<b>Copy Protection</b>	<b>HDCP 2.2 / Above</b>		
Audio			
Input Signal Types	HDMI (Dual-Mode Display Port interface compatible)		
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels		
Analog Formats	Stereo 2-channel		
Communications			
Ethernet	8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;2 PoE+ PD (powered device) port, IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant;		
HDMI OUTPUT	HDMI Type A connector, female; HDMI digital video/audio output1 (DVI compatible6)		
<b>IR 1 – 2</b>	<b>IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5 V) up to 19200 baud; detachable terminal block; Bidirectional RS-232 port;</b>		
COM	Up to 115.2k baud, hardware and software handshaking support		
<b>Instead of</b>			
Name of the Make/Brand and Model No		Make /Brand Name :	
		Model No	
Description		Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.

Minimum Performance Parameters.			
Decoding			
Video Codec	Pixel Perfect Processing / processing which support 4K60, 4:4:4, and HDR flawless video transport		
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10, HDR10+, Dolby Vision®, and Deep Color support		
Audio Formats	Primary multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)		
Bit Rates / <b>Optional</b>	200 to 850 Mbps or higher		
Streaming Protocols	RTP, SDP		
Container	MPEG-2 transport stream (.ts)		
Session Initiation	Multicast via secure RTSP		
Copy Protection	HDCP 2.2, AES-128, PKI		
Video			
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support <sup>1</sup> (DVI compatible <sup>6</sup> )		
Copy Protection	HDCP 2.2		
Audio			
Input Signal Types	HDMI (Dual-Mode Display Port interface compatible)		
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels		
Analog Formats	Stereo 2-channel		
Digital-To-Analog Conversion	24-bit 48 kHz		
AES67	24-bit 48 kHz		
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz;		
	Stereo Separation: >90 dB		
Analog Output Volume Adjustment	-80 to +20 dB		
Communications			
Ethernet	8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port; 2 PoE+ PD (powered device) port, IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant;		
HDMI OUTPUT	HDMI Type A connector, female; HDMI digital video/audio output <sup>1</sup> (DVI compatible <sup>6</sup> )		
AUDIO	5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output <sup>3</sup> ; Output Impedance: 200 Ohms balanced, 100 Ohms unbalanced; Maximum Output Level: 4 Vrms balanced, 2 Vrms unbalanced		
CONSOLE, USB	Micro USB connector, female; USB 2.0 computer console port (for setup)		
IR 1 – 2	4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5 V) up to 19200 baud; 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port;		
COM	Up to 115.2k baud, hardware and software handshaking support		
24VDC 2.0A	2.1 x 5.5 mm DC power connector/ equivalent		
	24 VDC power input ( Should Included in the Box, If not can be added separate )		

Ground	6-32 screw / equivalent		
	Chassis ground lug / equivalent		

**11. In Page No. 35 & 36, (B) – Technical Specification sheet for Audio and Video Conferencing System –  
Sl. No. 5 – AV Over IP Encoder may be read as**

Name of the Make/Brand and Model No		Make /Brand Name :
		Model No
Description	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.
Minimum Performance Parameters.		
Encoding		
<b>Video Codec</b>	<b>Pixel Perfect Processing / processing which support 4K60, 4:4:4, and HDR flawless video transport</b>	
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10, HDR10+, Dolby Vision®, and Deep Color support	
<b>Audio Formats</b>	<b>Primary multichannel</b>	
Bit Rates/ <b>Optional</b>	200 to 950 Mbps	
Streaming Protocols	RTP, SDP	
Session Initiation	Multicast via secure RTSP	
<b>Copy Protection</b>	<b>HDCP 2.2 or Optional AES-128, PKI</b>	
Video		
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support1 (DVI compatible6)	
<b>Copy Protection</b>	<b>HDCP 2.2 / Above</b>	
Audio		
Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible7	
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels	
Analog Formats	Stereo 2-channel	
Communications		
Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port; 2 PoE+ PD (powered device) port, IEEE 802.3at Type 2 PoE+	
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output1 (DVI compatible6)	
<b>AUDIO/ Optional</b>	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE browser setup and control	
<b>CONSOLE, USB / Optional</b>	USB 2.0 computer console (for setup)	
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and `software handshaking (via control system); computer console (for setup) (1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports;	
<b>IR/Serial</b>	<b>IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5 V) up to 19200 baud; detachable terminal block; Bidirectional RS-232 port;</b>	
<b>COM</b>	<b>Up to 115.2k baud, hardware and software</b>	



	<b>handshaking support</b>		
HDMI	HDCP 2.2, EDID, CEC		
<b>Instead of</b>			
Name of the Make/Brand and Model No		Make /Brand Name :	
		Model No	
Description		Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.
Minimum Performance Parameters.			
Encoding			
Video Codec	Pixel Perfect Processing / processing which support 4K60, 4:4:4, and HDR flawless video transport		
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10, HDR10+, Dolby Vision®, and Deep Color support		
Audio Formats	Primary multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)		
Bit Rates	200 to 950 Mbps		
Streaming Protocols	RTP, SDP		
Container	MPEG-2 transport stream (.ts)		
Session Initiation	Multicast via secure RTSP		
Copy Protection	HDCP 2.2, AES-128, PKI		
Video			
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support1 (DVI compatible6)		
Copy Protection	HDCP 2.2		
Audio			
Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible7		
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels		
Analog Formats	Stereo 2-channel		
Digital-To-Analog Conversion	24-bit 48 kHz		
AES67	24-bit 48 kHz		
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB		
Analog Output Volume Adjustment	-80 to +20 dB		
Communications			
Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;2 PoE+ PD (powered device) port,IEEE 802.3at Type 2 PoE+		
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output1 (DVI compatible6)		
AUDIO	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE browser setup and control		
CONSOLE, USB	USB 2.0 computer console (for setup)		
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and `software handshaking (via		

	control system); computer console (for setup) (1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports;		
IR/Serial	IR output up to 1.1 MHz;1-way serial TTL/RS-232 (0-5 V) up to 19200 baud;		
COM	1-way device control via infrared up to 1.1 MHz or serial TTL/RS-232 (0-5 V)		
HDMI	HDCP 2.2, EDID, CEC		

**12.In Page No. 36, (B) –Technical Specification sheet for Audio and Video Conferencing System –  
Sl. No. 6 – 52 port Layer 3 Managed 1 or above Gigabit Switch may be read as**

Name of the Make/Brand and Model No		Make /Brand Name :	
		Model No	
Description		Compliance	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.
		(Yes/No)	
Minimum Performance Parameters.			
USB slot			
Spanning Tree Protocol	Standard 802.1d Spanning Tree support; Fast convergence using 802.1w (Rapid Spanning Tree [RSTP]), enabled by default; 8 instances should be supported; Multiple Spanning Tree instances using 802.1s (MSTP)		
Port grouping	Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP) <ul style="list-style-type: none"> <li>Up to 8 groups</li> <li>Up to 8 ports per group with 16 candidate ports for each (dynamic) 802.3ad link aggregation</li> </ul>		
Multicast TV VLAN	Multicast TV VLAN allows the single multicast VLAN to be shared in the network while subscribers remain in separate VLANs (also known as MVR)		
Secure Shell (SSH) Protocol	SSH is a secure replacement for Telnet traffic. SCP also uses SSH. SSH v1 and v2 are supported		
Web user interface	Built-in switch configuration utility for easy browser-based device configuration (HTTP/HTTPS). Supports configuration, system dashboard, system maintenance, and monitoring.		
<b>Instead of</b>			
Name of the Make/Brand and Model No		Make /Brand Name :	
		Model No	
Description		Compliance	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.
		(Yes/No)	
Minimum Performance Parameters.			
USB slot			
Spanning Tree Protocol	Standard 802.1d Spanning Tree support; Fast convergence using 802.1w (Rapid Spanning Tree [RSTP]), enabled by default; 8 instances should be supported; Multiple Spanning Tree instances using 802.1s (MSTP)		
Port grouping	Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP)		

	<ul style="list-style-type: none"> <li>Up to 8 groups</li> <li>Up to 8 ports per group with 16 candidate ports for each (dynamic) 802.3ad link aggregation</li> </ul>		
Multicast TV VLAN	Multicast TV VLAN allows the single multicast VLAN to be shared in the network while subscribers remain in separate VLANs (also known as MVR)		
Secure Shell (SSH) Protocol	SSH is a secure replacement for Telnet traffic. SCP also uses SSH. SSH v1 and v2 are supported		
Web user interface	Built-in switch configuration utility for easy browser-based device configuration (HTTP/HTTPS). Supports configuration, system dashboard, system maintenance, and monitoring.		
Power	740 W Dedicated PoE Power		

**13. In Page No. 37, (B) –Technical Specification sheet for Audio and Video Conferencing System –  
Sl. No. 7 – USB 2.0 Extender may be read as**

Name of the Make/Brand and Model No		Make /Brand Name :	
		Model No	
Description		Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.
Minimum Performance Parameters.			
Communications			
Link	USB extension up to 100 m (330 ft) over solid-core CAT5e (or better) unshielded twisted pair (UTP) cable <sup>2</sup>		
USB Device Support	USB 1.0/1.1 and 2.0 compatible including mass storage and isochronous devices <sup>1</sup>		
USB Hub Support / <b>Optional</b>	Any signal chain may include up to 4 USB hubs plus		
Maximum USB Devices / <b>Optional</b>	30 USB devices, or 4 USB hubs with 26 USB devices		
Host Computer OS Support	Windows®, macOS®, and Linux® operating systems		
<b>USB Throughput</b>	<b>USB 2.0 up to 480 Mbps / USB 1.1 up to 12 Mbps</b>		
Connectors – Local endpoint			
Link	8-pin RJ45 connector, female; Connects directly to a Remote extender <sup>2</sup>		
USB	USB Type B connector, female; USB 2.0 device port for connection to the USB host computer, media server, game console, annotator, codec, etc.		
Connectors – Remote endpoint			
Link	8-pin RJ45 connector, female; Should connects to Link port on the Local endpoint		
<b>USB</b>	<b>USB Type A connectors, female; USB 2.0 host ports for connection of USB devices such as mice, keyboards, and other USB devices</b>		
<b>Instead of</b>			
Name of the Make/Brand and Model No		Make /Brand Name :	
		Model No	
Description		Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender

		document.
Minimum Performance Parameters.		
Communications		
Link	USB extension up to 100 m (330 ft) over solid-core CAT5e (or better) unshielded twisted pair (UTP) cable <sup>2</sup>	
USB Device Support	USB 1.0/1.1 and 2.0 compatible including mass storage and isochronous devices <sup>1</sup>	
USB Hub Support	Any signal chain may include up to 4 USB hubs plus	
Maximum USB Devices	30 USB devices, or 4 USB hubs with 26 USB devices	
Host Computer OS Support	Windows®, macOS®, and Linux® operating systems	
USB Throughput	USB 2.0 up to 480 Mbps, USB 1.1 up to 12 Mbps	
Connectors – Local endpoint		
Power	2.1 x 5.5 mm DC power connector; 24 V, 1A DC power input (power supply included)	
Link	8-pin RJ45 connector, female; Connects directly to a Remote extender <sup>2</sup>	
USB	USB Type B connector, female; USB 2.0 device port for connection to the USB host computer, media server, game console, annotator, codec, etc.	
Connectors – Remote endpoint		
Power	2.1 x 5.5 mm DC power connector; 24 V, 1A DC power input	
Link	8-pin RJ45 connector, female; Should connects to Link port on the Local endpoint	
USB	USB Type A connectors, female; USB 2.0 host ports for connection of USB devices such as mice, keyboards, and other USB devices Available USB Power: 1 A maximum per port, 1.5 A maximum total	

**14. In Page No. 37 & 38, (B) –Technical Specification sheet for Audio and Video Conferencing System –  
Sl. No. 8 – Unified Conference Bundle may be read as**

Name of the Make/Brand and Model No		Make /Brand Name :
		Model No
Description	Compliance	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.
	(Yes/No)	
Minimum Performance Parameters.		
Tabletop Touch Screen		
Touch Screen	<b>8" or above diagonal capacitive multi-touch TFT active matrix color LCD, 1920 x 1200 pixels, 400 nits Brightness, 1000:1 Contrast Ratio, 24 bit and 16.7M Color depth,5 Point Multi Touch Capable</b>	

<b>UC Client (This is the Stated Requirement, However Integrator can quote additional components to enable this feature when using polycom or other equivalent MS Teams Room System)</b>	Microsoft Teams Rooms with Skype® for Business software functionality with USB pass through for other UC calls		
<b>Instead of</b>			
Name of the Make/Brand and Model No			Make /Brand Name :
			Model No
Description	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.	
Minimum Performance Parameters.			
Tabletop Touch Screen			
Touch Screen	10.1 in. (257 mm) diagonal capacitive multi-touch TFT active matrix color LCD, 1920 x 1200 pixels, 400 nits Brightness, 1000:1 Contrast Ratio, 24 bit and 16.7M Color depth,5 Point Multi Touch Capable		
UI	Microsoft Teams UI plus optional Smart Graphics room control		
Ethernet	100 Mbps, auto switching, auto negotiating, auto discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, SNMP, IPv4 or IPv6, Active Directory® service authentication, HTTPS web browser setup		
Power over Ethernet	IEEE 802.3at Type 2 compliant PoE+ PD (Powered Device); Should provide 15 W from an 802.3at Type 2 PSE with LLDP advanced power management; Should provide 18 W from an 802.3at Type 2 PSE with LLDP; Should provide 30 W (PoE+ Class 4) from an 802.3at Type 2 PSE without LLDP; Should provide 15.4 W (PoE Class 0) from an 802.3af (or 802.3at Type 1) PSE		
PoE Injector	A PoE injector should be included to power the touch screen if network PoE is not available		
UC Bracket Assembly			
Mini PC	Intel Core® processor with Windows® 10 IOT Edition OS		
UC Client	Microsoft Teams Rooms with Skype® for Business software functionality with USB pass through for other UC calls		
Content Ingest	HDMI input via HDMI to USB 3.0 converter		
Display Output	Single display support		
Display Output Resolution	1080p		
Power	65 W via external 100-240 VAC, 50 Hz adapter (included)		
Construction	Metal mounting bracket, black, preassembled		

Mounting	Surface wall mount behind the display device, or attach to the rear of the display device via the bolts attaching the display to a display mount; Bracket includes mounting holes on both side edges, spaced 100, 200, and 300 mm vertically, to allow for attachment to either side of the display mounting plate		
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**15. In Page No. 41 & 42, (B) –Technical Specification sheet for Audio and Video Conferencing System –  
Sl. No. 15 – Control Processor may be read as**

Name of the Make/Brand and Model No		Make /Brand Name :	
		Model No	
Description	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.	
		Minimum Performance Parameters.	
Communications			
Ethernet	<b>100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, industry-standard TCP/IP stack, UDP/IP, DHCP, IPv4, Active Directory® service authentication, HTTPS web server, HTTPS web browser setup</b>		
USB / Optional	Should Support USB mass storage class devices via the rear panel USB 2.0 host port, supports computer console via the front panel USB 2.0 device port		
RS-232/422/485	<b>For 2-way device control and monitoring, COM port should support RS-232 up to 115.2k baud with software handshaking</b>		
IR/Serial/ <b>Optional</b>	Should support 1-way device control via infrared up to 1.2 MHz or serial TTL/RS-232 (0–5V) up to 115.2k baud		
Memory			
SDRAM/ <b>Optional</b>	2 GB / 512 MB		
Flash/ <b>Optional</b>	8 GB / 4.5 GB		
Memory Card/ <b>Optional</b>	Should support SD and SDHC cards up to 32 GB		
External Storage/ <b>Optional</b>	Should Support USB mass storage devices up to 1 TB		
Connectors			
<b>RELAY OUTPUT 1–4</b>	<b>Minimum of 4 Relay ports with 3.5 mm detachable terminal block; Should comprise normally open, isolated relays; Rated 1 A, 30 VAC/VDC; MOV arc suppression across contacts</b>		
I/O 1–4	Minimum of 4 I/O ports with 3.5 mm detachable terminal block; Should comprises (4) Versiport digital input/output or analog input ports (referenced to GND); Digital Input: Rated for 0–24 VDC, input impedance 20k Ω, logic threshold >3.125 V low/0 and <1.875 V high/1; Digital Output: 250 mA sink from maximum 24 VDC, catch diodes for use with real world loads;		

	Analog Input: Rated for 0–10 VDC, protected to 24 VDC maximum, input impedance 21k $\Omega$ with pull-up resistor disabled; Programmable 5 V, 2k $\Omega$ pull-up resistor per pin		
<b>IR - SERIAL OUTPUT 1–4</b>	<b>Minimum of 4 IR Ports 3.5 mm detachable terminal blocks;</b> <b>Should comprises (4) IR output ports;</b>		
<b>COM 1</b>	<b>3 pin or 5 pin 3.5 mm detachable terminal block;</b> <b>Bidirectional RS-232 ports;</b> <b>Up to 115.2k baud; Software handshaking support</b>		
COM 2–3	3-pin 3.5 mm detachable terminal blocks; Bidirectional RS-232 ports; Up to 115.2k baud; software handshaking support		
<b>MEMORY/ Optional</b>	SD memory card slot; Accepts one SD or SDHC card up to 32 GB for storage of log files		
<b>USB</b>	<b>USB Type A connector, female / Optional USB 2.0 port for storage devices</b>		
LAN	8-pin RJ45 connector, female; 100/1000Base-TX Ethernet port		
CONTROL SUBNET / OPTIONAL	8-pin RJ45 connector, female; 100/1000Base-TX Ethernet port;		
<b>Instead of</b>			
Name of the Make/Brand and Model No			Make /Brand Name :
			Model No
Description		Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document.
Minimum Performance Parameters.			
Communications			
Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, industry-standard TCP/IP stack, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), FIPS 140-2 compliant encryption, IEEE 802.1xX, SNMP, BACnet™ and IP1, IPv4 or IPv6, Active Directory® service authentication, HTTPS web server, HTTPS web browser setup		
USB / Optional	Should Support USB mass storage class devices via the rear panel USB 2.0 host port, supports computer console via the front panel USB 2.0 device port		
RS-232/422/485	For 2-way device control and monitoring, COM port should support RS-232 up to 115.2k baud with software handshaking, one port also should support RS-422 or RS-485 and hardware handshaking		
IR/Serial	Should support 1-way device control via infrared up to 1.2 MHz or serial TTL/RS-232 (0–5 V) up to 115.2k baud		
Memory			
SDRAM	2 GB / 512 MB		
Flash	8 GB / 4.5 GB		
Memory Card	Should support SD and SDHC cards up to 32 GB		
External Storage	Should Support USB mass storage devices up to 1 TB		
Connectors			
RELAY OUTPUT 1–4	Minimum of 4 Relay ports with 3.5 mm detachable terminal block;		

	Should comprise (8) normally open, isolated relays; Rated 1 A, 30 VAC/VDC; MOV arc suppression across contacts		
I/O 1–4	Minimum of 4 I/O ports with 3.5 mm detachable terminal block; Should comprises (4) Versiport digital input/output or analog input ports (referenced to GND); Digital Input: Rated for 0–24 VDC, input impedance 20k $\Omega$ , logic threshold >3.125 V low/0 and <1.875 V high/1; Digital Output: 250 mA sink from maximum 24 VDC, catch diodes for use with real world loads; Analog Input: Rated for 0–10 VDC, protected to 24 VDC maximum, input impedance 21k $\Omega$ with pull-up resistor disabled; Programmable 5 V, 2k $\Omega$ pull-up resistor per pin		
IR - SERIAL OUTPUT 1–4	Minimum of 4 IR Ports 3.5 mm detachable terminal blocks; Should comprises (4) IR output ports; IR output up to 1.2 MHz; 1-way serial TTL/RS-232 (0–5 V) up to 115.2k baud		
COM 1	5-pin 3.5 mm detachable terminal block; Bidirectional RS-232/422/485 port; Up to 115.2k baud; hardware and software handshaking support		
COM 2–3	3-pin 3.5 mm detachable terminal blocks; Bidirectional RS-232 ports; Up to 115.2k baud; software handshaking support		
MEMORY	SD memory card slot; Accepts one SD or SDHC card up to 32 GB for storage of log files		
USB	USB Type A connector, female; USB 2.0 port for storage devices		
LAN	8-pin RJ45 connector, female; 100/1000Base-TX Ethernet port		
CONTROL SUBNET / OPTIONAL	8-pin RJ45 connector, female; 100/1000Base-TX Ethernet port;		
COMMUNICATION BUS	4-pin 3.5 mm detachable terminal block; Network master port; Outputs power to Network devices only if the included power pack is connected to the 24 VDC power input jack; Alternately functions as a Network power input to power the unit from a Network power supply / eBUS control ports - eBUS pin configuration		
Power / Equivalent	2.1 x 5.5 mm DC power connector / equivalent; 24 V, 2A DC power input; Passes through to the NET port to power Network devices;		
Ground	6-32 screw; Chassis ground lug / equivalent		
COMPUTER (front)	USB Type B connector, female; USB 2.0 computer console port;		
Features/Optional	Should be able to run 10 Programs simultaneously		



16. In Page No. 52 – Proforma Format for Financial Bid (BOQ) Format - Sl. No. 6 may be read as

Sl.No	Description	Qty	UoM	Rate per unit	Total cost without Tax	GST	Total cost with tax
6	<b>52 port Layer 3 Managed 1 or above Gigabit Switch</b>	1	No.				
<b>Instead of</b>							
6	Layer 3 Managed Gigabit Switch	1	No.				

**NOTE:**

- Further request if any received from the bidders for an amendment will not be considered.
- BOQ not able to update due to process started for bid submission.

All other conditions remain unchanged.

Sd/-  
Assistant Registrar (Stores & Purchase)