

## TECHNICAL SPECIFICATION (Revised)

ITEM	SPECIFICATIONS	Compliance	
1	Audio and Video System for BCDA Clark Extension Office	Compliant	Non-Compliant
	<p><b><u>I. BOARDROOM</u></b></p> <p><b><u>1. Display:</u></b></p> <p>A. Main Display: (1 unit)</p> <ul style="list-style-type: none"> <li>● Screen size: 86" Ultra HD Display</li> <li>● Interactive</li> <li>● Native Resolution: 3840 x 2160 (UHD)</li> <li>● Brightness (Module, cd/m<sup>2</sup>): 410</li> <li>● Input: HDMI (3), DP, DVI-D, RGB, Audio in, USB 3.0, USB 2.0, OPS USB 2.0</li> <li>● Output: Touch USB 2.0 (2)</li> <li>● Touch type: InGlass Technology</li> <li>● Multi touch point: Max 20 Point</li> <li>● Available object size for touch: more than Ø 3 mm, Accuracy: 2 mm</li> <li>● Vesa Standard Mount Interface: 600 x 400 mm</li> <li>● Protection Glass Thickness: 4T (Anti-Glare)</li> <li>● with Bracket</li> </ul> <p>B. Wireless Presentation Technology: (1 unit)</p> <ul style="list-style-type: none"> <li>● Mobile App OS Support: Apple iOS, Android Client</li> <li>● Software OS Support: Windows 7, Windows 8, Window 10, macOS (versions 10.10 through 10.13)</li> <li>● Client Software Video Frame Rate: 30 fps, audio supported</li> <li>● Full Screen Device Mirroring: Shares the screen image and audio from an Apple iOS, Android, macOS, or Windows device</li> <li>● Resolutions: 800x600@60Hz, 1024x768@60Hz, 1280x720@60Hz (720p60), 1280x768@60Hz, 1280x800@60Hz, 1280x1024@60Hz, 1360x768@60Hz, 1400x1050@60Hz, 1440x900@60Hz, 1600x1200@60Hz, 1920x1080@60Hz (1080p60), 1920x1200@60Hz</li> <li>● Bitrate Peak: 0.25 to 8.5 Mbps, variable depending on content complexity</li> </ul>		



- Bitrate Average: 1.4 Mbps typical
- Audio Format: Stereo

## 2. Programmed Audio System:

### A. Ceiling Loud Speakers: (6 units)

- In-Ceiling speaker with integral (blind mount) Back Can
- Baffle: Reflex loaded UL 94V-0 rated ABS
- Frequency Response (-3dB): 79Hz - 21kHz
- Frequency Range (-10dB): 60Hz - 24kHz
- System Sensitivity (1W @1m): 91dB (1W = 2.45V for 6 Ohms)
- Nominal Coverage Angle: 90 degrees conical
- Coverage Angle (1kHz to 6kHz): 93 degrees conical
- Power Handling: Average - 60W; Programmed - 120W; Peak – 240W
- Rated Maximum SPL: Average: 109dB, Peak: 115dB
- Nominal Impedance: 6 ohms

### B. Power Amplifier: (1 unit)

- RMS Power: 240 W
- Signal / Noise: > 90 dB
- Protection: DC Short circuit, Overheating, Over load, Signal limiting
- Cooling: Dual speed controlled FAN
- Frequency: Response ( $\pm 3$  dB): 70 Hz - 18 kHz
- Power: Supply: Conventional (Transformer)
- Power: Source: 230 ~ 240 V AC / 50 ~ 60 Hz (110~115 V AC / 50~60 Hz after connection change)
- Inputs: Sensitivity (1W/1m): -12 dB ~ 0 dB
- Inputs: Impedance: 10 k $\Omega$  balanced
- Inputs: Connector: XLR female with Male Link through
- Outputs: Voltage / Impedance: 100 V / 42  $\Omega$ , 70 V / 21  $\Omega$ , 31 V / 4  $\Omega$
- Connector: 4-pin Euro Terminal block (Pitch - 5.08 mm with locking)

### C. Mixing Console: (1 unit)

- 12 Channel Mixing Console with DFX and Compressor

- Mono channels, Stereo channels
- With six balanced microphone inputs featuring high quality preamplifiers, a low-cut filter, an effective 3-band EQ with conveniently selected mids and switchable phantom power
- With RCA connectors for recording and playback devices and a Digital Effects Section with 100 presets
- With PFL (Pre-Fade Listen) function or Mute buttons
- Includes two effects loops, balanced XLR outputs, group and monitor outputs and a headphone jack
- With built-in compressor for an effective control of dynamics

D. Cardioid Boundary Microphone: (12 units)

- Transducer principle: pre-polarized condenser microphone
- Dimensions: 85 x 100 x 25 mm (WxDxH)
- Frequency response: 40 Hz – 20 kHz
- Pick-up pattern: Cardioid
- Nominal impedance: 200  $\Omega$
- Phantom powering: P 24 - P 48
- Equivalent noise level: 29 dB (A)
- Equivalent noise level weighted as per CCIR 468-3: 39 dB (CCIR)
- Current consumption: 5.3 mA
- Output voltage Logic out: High level output voltage > 2.4 V, low level output voltage < 0.4 V
- Output voltage Logic in: High level input voltage > 2.0 V, Low level input voltage < 0.8 V
- Acoustics: boundary layer microphone
- Dynamic range: 111 dB (A)
- Sensitivity: 10 mV/Pa

E. Fixed Audio Digital Signal Processor (DSP): (1 unit)

- 128 x 128 channels of Audio Video Bridging (AVB)
- 12 mic/line level inputs with AEC, 8 mic/line level outputs
- Gigabit Ethernet port
- Up to 8 channels of configurable USB audio
- RS-232 serial port
- 4-pin GPIO
- 2-line OLED display with capacitive-touch navigation

- Rack mountable (1RU)
- System configuration and control via Ethernet
- Internal universal power supply
- Fully compatible with AVB servers, endpoints, expanders, and controllers
- Signal processing via intuitive software allows configuration and control for signal routing, mixing, equalization, filtering, delay, etc.
- CE marked, UL listed, and RoHS compliant

F. Input and Output Expanders: (1 unit)

- 4-Channels
- Frequency Response: (20Hz~20kHz @ +4dBu): +0/-0.25dB
- THD+N (20Hz~20kHz): @ 0dB Gain, +4dBu In: < 0.006%, @ 54dB Gain, -50dBu In: < 0.040%
- EIN (20Hz~20kHz, 66dB Gain, 150Ω): < -125dBu
- Dynamic Range (20Hz~20kHz, 0dB): > 108dB
- Input Impedance (balanced): 8kΩ
- Maximum Input: +24dBu
- Input Gain Range (6dB Steps): 0 - 66dB
- Power: 802.3at (PoE+) Class 4
- Phantom Power: +48 VDC (7mA/input)
- Cross Talk (channel to channel @ 1kHz): @ 0dB Gain, +4dBu In: < -85dB, @ 54dB Gain, -50dBu In: < -75dB
- Sampling Rate: 48kHz
- A/D - D/A Converters: 24-bit

G. AVB Ethernet Switch: (1 unit)

- Ports: 5X AVB
- Operational Bandwidth: 10/100/1 Gigabit
- Front Panel: 12x Activity LED
- Voltage: 8 to 18 VDC, tip positive
- Current: 0.5 A

H. High Power Single Port Injector: (1 unit)

3. Control Systems Solution:

A. Control System Engine: (1 unit)

	<ul style="list-style-type: none"> <li>● Core 3 OS</li> <li>● Modular programming architecture</li> <li>● 512MB RAM &amp; 2GB Flash memory</li> <li>● Expandable storage up to 1TB</li> <li>● Rear panel MMC memory card slot</li> <li>● High-speed USB 2.0 host port</li> <li>● Front panel USB computer console port</li> <li>● One RS-232/422/485 with hardware and software handshaking</li> <li>● Two RS-232 ports with software handshaking only</li> <li>● 8 IR/serial, 8 relay, and 8 Versiport I/O ports</li> <li>● Backwards compatible to run existing SIMPL programs</li> <li>● Full Unicode (multi-language) support</li> <li>● Increased network throughput and security</li> <li>● Powered via external power pack</li> <li>● IIS v.6.0 Web Server</li> <li>● IPV6 ready</li> <li>● 1-space rack-mountable</li> </ul> <p>B. Ceiling Mount Occupancy Sensor: (1 unit)</p> <ul style="list-style-type: none"> <li>● Dual-technology</li> <li>● Sensing</li> <li>● Sensor Technology: Passive infrared and ultrasonic (40 kHz)</li> <li>● Coverage Area: 2,000 sq. ft.</li> <li>● Coverage Pattern: 360 degrees</li> <li>● LED Indicators: IR: (1) Red LED, indicates PIR detection Ultrasonic: (1) Green LED, indicates ultrasonic detection</li> <li>● Connections: (1) 5-pin 3.5 mm detachable terminal block; 16 AWG maximum wire width supported, includes the following terminals: +24V: DC power input</li> <li>● Power Requirements: Current Consumption: 45 mA at 24 Volts DC</li> </ul> <p>C. 7" Touch Screen: (1 unit)</p> <ul style="list-style-type: none"> <li>● TFT active matrix color LCD</li> <li>● Aspect Ratio: 17:10 WSVGA</li> <li>● Resolution: 1024 x 600 pixels</li> <li>● Brightness: 350 nits (cd/m<sup>2</sup>)</li> <li>● Contrast: 1100:01:00</li> </ul>		
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- Color Depth: 24-bit, 16.7M colors
- Illumination: Edgelit LED w/auto-brightness control
- Viewing Angle:  $\pm 80^\circ$  horizontal,  $\pm 80^\circ$  vertical
- Touch Screen: Projected capacitive, 5-point multi-touch capable
- **With Tabletop Kit Enclosure (1 unit)**

D. POE Switch: (1 unit)

- Number of Ports: 8 x 10/100/1000
- 802.3af
- Half/Full-duplex operation at 10/100Mbps
- Full-duplex operation at 1000Mbps
- Auto-Negotiation for each port
- Auto MDI/MDIX
- Switching Capacity: 16Gbps
- Max. Forwarding Rate: 11.9 Mpps
- MAC Address Table Size: 8K Entries
- Packet Buffer: 2Mbits
- Forwarding Mode: Store and Forward
- PoE Power Budget: 64W

E. Wireless Handheld Microphones: (2 units)

- True diversity half-rack receiver in a full-metal housing with intuitive LCD display for full control
- Easy and flexible wireless synchronization between transmitter and receiver via infrared
- Fast frequency allocation for up to 12 receivers via new linking functionality
- Up to 20 compatible channels
- Up to 42 MHz bandwidth with 1680 selectable frequencies, fully tunable in a stable UHF range
- Transmission Range: up to 100 meters / 300 feet
- High RF output power (up to 30 mW) depending on country regulations
- Frequency ranges:  
A1: 470 - 516 MHz / A: 516 - 558 MHz / AS: 520 - 558 MHz
- Switching the bandwidth up to 42 MHz
- AF frequency of response: 80 - 18,000hz
- Signal to noise ratio: 110dba
- Dimensions: 50x265mm
- Weight: 450g

F. Wireless Lavalier Microphone: (2 units)

- Receiver & Transmitter
- RF characteristics Modulation Wideband FM  
Frequency Ranges A1: 470 - 516 MHz A: 516 - 558 MHz AS: 520 - 558 MHz
- 20 frequency banks, each with up to 12 factory-preset channels, no intermodulation
- 1 frequency bank with up to 12 programmable channels Switching bandwidth up to 42 MHz  
Nominal/peak deviation  $\pm 24$  kHz /  $\pm 48$  kHz Receiver Principle True Diversity Sensitivity (with HDX, peak deviation)  $< 2.5 \mu\text{V}$  for 52 dBA eff S/N Adjacent channel selection Typically  $\geq 65$  dB Intermodulation Attenuation Typically  $\geq 65$  dB Blocking  $\geq 70$  dB
- Squelch low: 5 dB $\mu\text{V}$  middle: 15 dB $\mu\text{V}$  high: 25 dB $\mu\text{V}$   
Pilot tone squelch can be switched off Antenna inputs 2 BNC sockets
- AF characteristics Compander system EQ presets (switchable, act on line and monitor outputs) Preset 1: Flat Preset 2: Low Cut (-3 dB at 180 Hz) Preset 3: Low Cut/High Boost (-3 dB at 180 Hz, +6 dB at 10 kHz) Preset 4: High Boost (+6 dB at 10 kHz) Signal-to-noise ratio (1 mV, peak deviation)  $\geq 110$  dBA Total harmonic distortion (THD)  $\leq 0.9$  % AF output voltage (at peak deviation, 1 kHz AF) 6.3 mm jack socket (unbalanced): +12 dBu XLR socket (balanced): +18 dBu Setting range "AF Out" 48 dB (3 dB steps)
- Transducer principle pre-polarized condenser microphone Pick-up pattern cardioid Sensitivity (free field, no load) (1 kHz) 40 mV/Pa Max. SPL at 1 kHz 120 dB Frequency response 50 to 18,000 Hz Equivalent noise level A-weighted (DIN IEC 651) 31 dB Connector 3.5 mm jack Cable length approx. 1.60 m Supply voltage 7.5 V

4. Room Scheduling System

A. 7" Touch Screen: (1 unit)

- TFT active matrix color LCD
- Aspect Ratio: 17:10 WSVGA
- Resolution: 1024 x 600 pixels
- Brightness: 350 nits (cd/m<sup>2</sup>)

- Contrast: 1100:01:00
- Color Depth: 24-bit, 16.7M colors
- Illumination: Edgelit LED w/auto-brightness control
- Viewing Angle: ±80° horizontal, ±80° vertical
- Touch Screen: Projected capacitive, 5-point multi-touch capable
- **With Universal Mounting Bracket (1unit)**

B. Meeting Room Availability Sign: (1 unit)

- Acrylic, two sided
- Maximum Surface Thickness: 1-1/4 in (32 mm)
- Minimum Mounting Depth: 2-13/16 in (72 mm)

5. Video Conferencing System: (1 set)

- Must be able to join from any video conferencing system platform,
- Hardware must be optimized to run on a cloud platform, for easy access to hosted conferences,
- Must be able to connect to any mobile devices,
- Must be able to connect to two or more participants (scalable),
- With software and technical support (includes firmware updates).

A. Technical Specifications:

- Hardware component: table microphone, wall mount for codec plus
- Bandwidth: up to 6 Mbps point to point
- Minimum bandwidth for resolution/frame rate: H.264
  - 720p30 from 768 kbps
  - 720p60 from 1152 kbps
  - 1080p30 from 1472 kbps
  - 1080p30 from 2560 kbps
- Firewall traversal: H.460.18, H.460.19 firewall traversal
- Video Inputs: One HDMI Input supports formats up to maximum 1080p60, two HDMI inputs support formats up to maximum 4K (3840 x 2160) at 30fps
- Video Outputs: two HDMI outputs support formats up to 3840 x 2160p60 (4Kp60), Live video resolutions (encode and decode) up to 1920 x 1080p60 (HD1080p, Consumer Electronics Control (CEC) 2.0



	<ul style="list-style-type: none"> <li>• Audio Standards: G.711, G722, G722.1, G729, AAC-LD, and Opus</li> <li>• Audio Features: High quality 20kHz audio, Subwoofer line out for Quad Camera, Prepared for inductive loop (line out), Automatic Gain Control (AGC), Automatic noise reduction, Active lip synchronization</li> <li>• Speakers (internal): High-quality speakers, Frequency response 70Hz to 20kHz, Max output level SPL 90db</li> <li>• Speaker tracking: 6-element microphone array for accurate speaker tracking</li> <li>• Wireless Sharing</li> <li>• Multipoint support: 4-way embedded SIP/H.323 conferencing capability with Multisite option</li> <li>• Multisite features: Adaptive SIP/H.323 Multisite <ul style="list-style-type: none"> <li>3-way resolution up to 1080p30 _ content up to 4Kp5</li> <li>4-way resolution up to 720p30 _ content up to 4Kp5</li> </ul> </li> <li>• Full individual audio and video transcoding</li> <li>• H.323/SIP/VoIP in the same conference</li> <li>• Support for presentation (H.239/BFCP) from any participant at resolutions up to 3840 x 2160p5</li> <li>• Embedded encryption: Automatic key generation and exchange</li> <li>• IP Network: <ul style="list-style-type: none"> <li>DNS lookup for service configuration</li> <li>• Differentiated services (Quality of Service [QoS]) <ul style="list-style-type: none"> <li>• IP-adaptive bandwidth management (including flow control)</li> <li>• Automatic gatekeeper discovery</li> <li>• Dynamic playout and lip-sync buffering</li> <li>• H.245 Dual-Tone Multi-frequency (DTMF) tones in H.323</li> <li>• RFC 4733 DTMF tones in SIP</li> <li>• Date and time support using Network Time Protocol (NTP)</li> <li>• Media adaption and resilience</li> <li>• Uniform Resource Identifier (URI) dialing</li> <li>• Dynamic Host Configuration Protocol (DHCP)</li> <li>• 802.1X network authentication</li> <li>• 802.1Q Virtual LAN</li> </ul> </li> </ul> </li> <li>• IPv6 Network Support:</li> </ul>		
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	<p>Single call stack support for both H.323 and SIP</p> <ul style="list-style-type: none"> <li>• Dual-stack IPv4 and IPv6 for DHCP, SSH, HTTP, HTTPS, DNS, DiffServ</li> <li>• Support for both static and automatic IP configuration (stateless address auto configuration)</li> <li>• Security Features: <ul style="list-style-type: none"> <li>Management using HTTPS and SSH</li> <li>• IP administration password</li> <li>• Menu administration password</li> <li>• Disable IP services</li> <li>• Network settings protection</li> </ul> </li> <li>• Network Interfaces Codec Medium: <ul style="list-style-type: none"> <li>One Ethernet (RJ-45) 10/100/1000 for LAN</li> <li>• One Ethernet (RJ-45) 10/100/1000 for direct pairing with camera</li> <li>• One Ethernet (RJ-45) 10/100/1000 with Power over Ethernet (PoE) for direct pairing with Touch 10</li> <li>• Wi-Fi 802.11a/b/g/n/ac 2.4 GHz/5 GHz for LAN. 2x2 MIMO</li> <li>• Bluetooth 4.0 LE</li> </ul> </li> <li>• Other interface: USB 2.0 port, uUSB, factory reset pinhole</li> <li>• Power supplies: 100 to 240 VAC, 50/60 Hz, 12V DC input</li> <li>• Camera Overview: <ul style="list-style-type: none"> <li>• 5K Ultra HD Camera</li> <li>• Support up to 60 fps</li> <li>• 15.1 MP image sensor</li> <li>• 1/1.7 CMOS</li> <li>• 5x digital zoom (3 tele-lenses each with 50-degree horizontal field of view)</li> <li>• f/2.0 aperture</li> <li>• Auto focus, brightness and white balance</li> <li>• Focus distance 1m infinity</li> </ul> </li> </ul> <p>B. Features:</p> <ul style="list-style-type: none"> <li>• Includes a cloud-based phone system, with the ability to connect other call control capabilities and services, and encompasses all the devices to make calls,</li> </ul>		
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- Secure, all-in-one team collaboration. Move work forward in secure work spaces where everyone can contribute anytime with messaging, file sharing, white boarding, video meetings, calling.
- with File storage
- Integrate existing IT assets to provide a single, integrated experience.

6. Display: (2 units) - will be installed on both sides of main display

- Screen size: 49" FHD Display
- Resolution: 1920 x 1080 Pixels
- Brightness: 350
- Input: HDMI (2), DVI-D, RGB, Audio
- Output: Audio
- External Control: RS232C in/out, RJ45, IR Receiver, USB
- Power Supply: 100-240V~, 50/60Hz
- Power Consumption: 65W, Energy Saving: 50W
- Compatible with VESA-wall mounting system: 300 x 300
- with Bracket (either Ceiling Mount or Wall mounted)

7. Connectivity: Table-Mount Modular: (2 units)

- > Must have Flip top, Table Mount Multi-Connection Solution:
  - Black Anodized
  - Connectors – Bottom Panel
  - Temperature: 32° to 112° F (0° to 45° C)
  - Humidity: 10% to 90% RH (non-condensing)
  - Chassis: Metal, black
  - Cover: Aluminum, black anodized or brushed aluminum finish
  - Mounting: Flush tabletop mount, 1-3/4 in (44 mm) maximum surface thickness, 6-1/4 in (159 mm) deep x 7-1/2 in (190 mm) wide cutout (template provided)
  - Width: 7.98 in (203 mm); / 9.19 in (234 mm) with mounting brackets
  - Depth: 6.77 in (172 mm); / 7.88 in (200 mm) with lid open
  - Weight: 5.7 lbs. (2.6 kg)
  - With Flip Top Power Outlet Module (2 units)
  - With Cable Retractable for CAT5e (2 units)
  - With Cable Retractable for HDMI (2 units)
  - With Cable Retractable for USB (2 units)

<p><u>8. Platform Document Visualizer: (1 unit)</u></p> <ul style="list-style-type: none"> <li>● Pixel Count: 5 megapixels</li> <li>● Sensor: 1/3.2" CMOS</li> <li>● Shooting Area: Max. 15.74" x 11.81"</li> <li>● Zoom: 16X Optical + 15X Digital Zoom (Total = 240X)</li> <li>● RGB Input/Output: 15-Pins D-sub (VGA) x 2 (2 out - cloned)</li> <li>● HDMI Output</li> </ul> <p><u>9. Desktop: (1 unit)</u></p> <ul style="list-style-type: none"> <li>● 21.5" Display size</li> <li>● 3.4GHz quad-core 7th-generation Intel Core i5 processor</li> <li>● Turbo Boost up to 3.8GHz</li> <li>● 8GB 2400MHz memory, configurable up to 32GB</li> <li>● 1TB Fusion Drive1</li> <li>● Radeon Pro 560 with 4GB video memory</li> <li>● Two Thunderbolt 3 ports</li> <li>● Retina 4K 4096x2304 P3 display</li> </ul> <p><u>10. Presenter: (1 unit)</u></p> <ul style="list-style-type: none"> <li>● Connectivity: USB wireless receiver</li> <li>● With cursor control</li> <li>● Long range 2.4GHz wireless technology</li> <li>● Storable ultra-slim wireless receiver</li> </ul> <p><u>11. With high-grade HDMI interface cables</u></p> <ul style="list-style-type: none"> <li>● Supports 4K60 4:4:4 video, 18Gbps bandwidth @ up to 20 ft (6.1 m)</li> <li>● Supports 4K60 4:2:0 and 4K30 4:4:4 video @ 30 ft (9.1 m)</li> <li>● Guaranteed end-to-end system performance</li> <li>● High-flex CL3-rated jacket</li> <li>● RoHS compliant</li> </ul> <p><u>12. 10 RU Metallic Equipment Rack</u></p>		
<p><b><u>II. MEETING ROOMS</u></b></p> <ol style="list-style-type: none"> <li><b>1. Executive Meeting Room</b></li> <li><b>2. BDOG Meeting Room</b></li> <li><b>3. Subsidiary Meeting Room</b></li> <li><b>4. CSG Meeting Room</b></li> </ol> <p><b><u>EACH ROOM MUST HAVE:</u></b></p>		



1. Display: (1 unit/room)

- Screen Size: 65"
- Resolution: 3,840 x 2,160 (UHD)
- Panel Technology: IPS
- Brightness: 500 cd/m<sup>2</sup>
- Input: HDMI, DP, DVI-D, USB 3.0, SD Card  
Output: Audio, DP  
External Control: RS232C, RJ45
- Picture-in-picture and Picture-by-picture
- Contrast Ratio: 1,000:1
- Dynamic CR: 1,000,000: 1
- Viewing Angle (H x V): 178 x 178
- Orientation: Portrait & Landscape
- Input: HDMI, DP, DVI-D, Audio, USB 3.0, SD Card
- Output: DP, Audio, External Speaker out
- External Control: RS232C, RJ45, IR Receiver, Pixel Sensor
- External Media player Attachable: Yes
- Power Consumption Smart Energy Saving: 90W
- Safety: UL / cUL / CB / TUV / KC
- EMC: FCC Class "A" / CE / KCC
- ErP / Energy Star: NA / EPA7.0

2. Connectivity: Table-Mount Modular: (1 set/room)

- Must have one (1) unit Table Mount Multi-Connection Solution – Retractable lid
- High-grade cables to be used
- With High-speed HDMI and Ethernet
- With Cable Retractor
- With USB and Power (Universal) Socket, Inner Frame
- Power Source: Single socket: 100–240V AC 50/60Hz, 5A
- With Wall plate insert
- Dimensions: 21.4cm x 19.2cm x 13.6cm (8.42" x 7.56" x 5.35") W, D, H
- Weight: 2kg (4.4lbs) approx.

3. Streaming Media Player: (1 unit)

- Stream 4K content from smartphone / Tablet / PC / Mac  
Built-in Wi-Fi & Ethernet, Optimizes 4K & HDR content for TV Access

4. VGA/Audio to HDMI Converter: (1unit/room)



	<p>5. <u>With multi-port adapter/connector (USB-C, Thunderbolt, Mini-HDMI, etc.)</u></p>		
	<p><b><u>III. MINI-AUDITORIUM</u></b></p> <p><b><u>1. Video System</u></b></p> <p>A. Display (1 unit):</p> <ul style="list-style-type: none"> <li>● Ultra HD 3.0 Display</li> <li>● Screen Size: 97.52 inches (2476.95 mm) diagonal</li> <li>● Native Resolution: 3840 x 2160 (UHD)</li> <li>● Brightness: 500</li> <li>● Connectivity: Input: HDMI, DP, DVI-D, USB, Audio, SD Card; Output: Audio, External speaker</li> <li>● External Control: RS232C In/Out, RJ45, IR Receiver, Pixel Sensor</li> <li>● HDTV Formats: HDMI: 720p, 1080i, 1080p, 2160p</li> <li>● Digital (w/ HDCP): Yes (1) w/ HDCP: DP, w/o HDCP: HDMI3/DVI/OPS</li> <li>● VESA™ Standard Mount Interface: 800x400</li> <li>● With Wall Bracket and Frame.</li> </ul> <p>B. HDMI Switch: (1 unit)</p> <ul style="list-style-type: none"> <li>● Allows up to 4 HDMI sources to be connected to one HDMI display</li> <li>● HDMI 2.0(3D, Deep Color, 4K); HDCP 2.2 compliant</li> <li>● Superior video quality- True 4k resolutions of 4096 x 2160 / 3840 x 2160 @ 60 Hz (4:4:4)</li> <li>● Compliance: HDMI 2.0 (3D, Deep Color, 4K)</li> <li>● Built-in bi-directional RS-232 serial port for high-end system control</li> <li>● Data rates up to 18 Gbps (6 Gbps Per Lane)</li> <li>● HD lossless audio formats</li> <li>● Instant Switching for a smooth video transition between HDMI ports, bi-directional RS-232, and IR for remote device control</li> </ul> <p><b><u>2. Audio System</u></b></p> <p>A. Ceiling Speaker: (6 units)</p> <ul style="list-style-type: none"> <li>● Speaker type: 2-way coaxial</li> <li>● Max. Power: 160 W</li> </ul>		

- RMS Power: 80 W
- Impedance: 8  $\Omega$
- Sensitivity (1W/1m): 89 dB
- Dispersion: Conical 135°
- Frequency Response ( $\pm 3$  dB): 46 Hz - 20 kHz
- Frequency Range (-10 dB): 32 Hz - 20 kHz
- Drivers: HF 1" Aluminum membrane; LF 8" Aluminum membrane

B. Ceiling Sub-woofer: (2 units)

- Max. Power: 200W
- RMS Power: 100w
- Impedance: 8  $\Omega$
- Sound Pressure (Max. W/1m): 108 dB
- Frequency Response ( $\pm 3$  dB): 50 Hz - 250 Hz
- Frequency Range (-10 dB): 28 Hz - 300 Hz
- Crossover Frequency: 250 Hz / Type: Passive built-in
- Dispersion Horizontal: 180° / Vertical: 180°
- Drivers: LF 10"

C. Power Amplifier: (1 unit)

- Quad-Channel
- Signal / Noise: > 95 dB
- THD+N (@ 1 kHz): < 0.05% (1/2 Rated Power)
- Crosstalk (@ 1 kHz): > 70 dB
- Common mode rejection ratio: 70 dB
- Cooling: Temperature controlled FAN
- RMS Power: @ 4  $\Omega$  Stereo 4 x 350 W; @ 8  $\Omega$  Stereo 4 x 220 W; @ 8  $\Omega$  Bridge 2 x 700 W
- Frequency Response ( $\pm 3$  dB): 20 Hz - 20 kHz
- Sensitivity (1W/1m): -19.5 dB ~ 27 dB
- Impedance: 10 k $\Omega$  balanced
- Inputs: Connector: XLR & 3-pin Euro Terminal Block (3.81 mm)
- Outputs: Connector: Speakon compatible & 2-pin Euro Terminal Block (5.08 mm)
- Protection: Amplifier: DC Short circuit / Over heating / Over load / Signal limiting; Loudspeaker: Power limiter; Access: User & Administrator level (Through password and USB-key protection)
- Power: Supply: Switching mode; Source: 230 ~ 240 V AC / 50 ~ 60 Hz

#### D. Signal Processor:

- 3-Channel
- AD/DA converter: 24bit
- Sampling frequency: 48 kHz
- Frequency response: 20 – 20,000 Hz
- Filter type: Linkwitz-Riley, Butterworth, Bessel
- Delay: Max. 12.5mS
- Filter slew rate: 18dB/oct, 24dB/oct, 12dB/oct, 6dB/oct
- Dynamic range: > 100 dB
- Signal-to-noise ratio: 87dB
- Crosstalk: >80dB
- Input impedance: 22 k $\Omega$
- Output impedance: 300  $\Omega$
- Controls: Recall, Parameter, Edit, Power
- Indicators: Multifunction LC display
- Line inputs: 2
- Line input connector: XLR
- Line outputs: 3
- Line output connector XLR (balanced)
- Interfaces: USB
- Mains: IEC socket
- Operating voltage: 90 V AC - 250 V AC, 50 - 60 Hz

#### E. Mixing Control: (1 unit)

- 12-Channel
- With DFX and Compressor
- Controls Mono Mic and Line Input Channels: Compressor, PFL, AUX 1 umschaltbar Pre/Post, Low Cut (75 Hz), Gain, 3-band EQ (High, Mid, Low), AUX 2 (DFX) Post, DFX/AUX 1
- Controls Stereo Line Input Channels: Low Cut, DFX/AUX 1, Balance, AUX 2 (DFX) Post, AUX 1 umschaltbar Pre/Post, Gain, 3-band EQ (High, Mid, Low), 2-band EQ (High, Low), Channel Volume
- Main section controls: Group 1-2 Volume, CTRL / Phones assignment (Main/Group 1-2), Volume Control CTRL / Phones, DFX Mute Schalter, DFX TO AUX Volume, 2-track Assignment (Main, Contr. Room), Stereo Return to MAIN Volume, Phantom Power, Group 1-2 assignment to Main MIX, PFL, AUX 2 Send Volume, presets, 2-track In Volume, Power,





	<p>DFX To Main Volume, Stereo Return to AUX Volume, Master Volume</p> <ul style="list-style-type: none"> <li>● Indicators: DFX TO MAIN, Power, Phantom Power, DFX Peak, PFL</li> <li>● Operating voltage: 100 V AC - 240 V AC, 50 - 60 Hz</li> </ul> <p>F. Wireless Handheld Microphones: (2 units)</p> <ul style="list-style-type: none"> <li>● True diversity half-rack receiver in a full-metal housing with intuitive LCD display for full control</li> <li>● Easy and flexible wireless synchronization between transmitter and receiver via infrared</li> <li>● Fast frequency allocation for up to 12 receivers via new linking functionality</li> <li>● Up to 20 compatible channels</li> <li>● Up to 42 MHz bandwidth with 1680 selectable frequencies, fully tunable in a stable UHF range</li> <li>● Transmission Range: up to 100 meters / 300 feet</li> <li>● Frequency ranges: A1: 470 - 516 MHz; A: 516 - 558 MHz; AS: 520 - 558 MHz</li> <li>● Switching the bandwidth up to 42 MHz</li> <li>● AF frequency of response: 80 - 18,000hz</li> <li>● Signal to noise ratio: 110dba</li> </ul> <p>G. Cardioid Microphones: (2 units)</p> <ul style="list-style-type: none"> <li>● Vocal Dynamic</li> <li>● Connector - XLR 3</li> <li>● Frequency response (Microphone): 40 - 16000 Hz</li> <li>● Sensitivity in free field, no load (1kHz): 1,8 mV/Pa</li> <li>● Nominal impedance: 350 Ω</li> <li>● Min. terminating impedance: 1000 Ω</li> </ul> <p>H. Microphone Stands: (4 units)</p> <ul style="list-style-type: none"> <li>● Base material - Zinc die-cast</li> <li>● Tubing material – steel</li> <li>● Tubing surface - powder coated</li> <li>● Height adjustment – yes</li> <li>● Base type – Tripod</li> <li>● Boom model - 2-point adjustment</li> <li>● 5-year Warranty</li> </ul> <p><u>3. Laptop (for presentations): (1 unit)</u></p>		
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	<ul style="list-style-type: none"> <li>• Processor: Intel Core i7-7700HQ</li> <li>• Operating System: Windows 10</li> <li>• Memory: 8GB</li> <li>• Graphics Card: GTX1050 4GB</li> <li>• Storage: 1 TB + 128 GB SSD</li> <li>• Display size: 15" FHD</li> </ul> <p><u>4. Power Conditioner with Rack Lighting: (1 unit)</u></p> <ul style="list-style-type: none"> <li>• 19" / 1U</li> <li>• Number of Outlets (IEC C14): 9</li> <li>• Nominal Impedance: max 10A</li> <li>• Protection Against Impulse Voltage - neutral conductor to earth, outer conductor to neutral, outer conductors to protection light</li> <li>• Response Time 1 ns</li> <li>• Max. Surge Current 6000A (8x20 µs pulse)</li> <li>• Max. Surge Energy 70 joules per contact</li> <li>• Noise Cancelling &lt;20 dB, 1.5 MHz-200 MHz</li> <li>• Mains connector IEC mains cord</li> <li>• Features - incl. telescopic rack light, including 4 power cords</li> </ul> <p><u>5. Others:</u></p> <ol style="list-style-type: none"> <li>1. VGA/Audio to HDMI Converter</li> <li>2. Frame for Wall Plate, HDMI Wall Plate, XLR Wall Plate</li> <li>3. 10 RU Metallic Equipment Rack</li> <li>4. UPS 10KVA</li> </ol>		
	<p><b><u>IV. INTERACTIVE / EXHIBIT AREA</u></b></p> <p><u>1. Video System</u></p> <p>A. Display:</p> <p>a. Video Wall (front): (15 units), 5 x 3 Orientation (L x H)</p> <ul style="list-style-type: none"> <li>• Screen size: 55" class (54.64" diagonal)</li> <li>• Panel Technology: In-Plane Switching</li> <li>• Aspect Ratio: 16:09</li> <li>• Viewing Angle: 178 x 178 degrees</li> <li>• Response time: 8ms (G to G BW)</li> <li>• Native Resolution: 1920 x 1080 (FHD)</li> <li>• Brightness: 700 cd/m<sup>2</sup></li> <li>• Contrast Ratio: 1,400:1</li> <li>• Dynamic CR: 500,000: 1</li> </ul>		

- Orientation: Portrait & Landscape
- Connectivity: Input: HDMI, DP, DVI-D, OPS, Analog, RGB, RS232 IN, RJ45 IN, IR Receiver, USB (USB3.0, USB2.0), HDTV Formats, HDMI: 720p, 1080i, 1080p  
Output: DP Out, DP1.2a/HDCP1.3, Audio Out, RS232C OUT
- With Frame and Wall Brackets

b. Side Displays (left and right wall): 3 units each side (6 units total)

- Screen Size: 65"
- Panel Technology: IPS
- Aspect Ratio: 16:09
- Native Resolution: 3,840 x 2,160 (UHD)
- Brightness: 500cd/m2
- Contrast Ratio: 1,000:1
- Viewing Angle (H x V): 178 x 178
- Orientation: Portrait & Landscape
- Input: HDMI, DP, DVI-D, Audio, USB 3.0, SD Card
- Output: DP, External Speaker out
- External Control: RS232C, RJ45, IR Receiver, Pixel Sensor
- Power Supply: 100–240V~, 50/60Hz
- Bezel Color: Black
- External Media player Attachable: Yes

c. With Advanced Signage Content Management Solution for Twenty-one (21) Displays:

- All-in-one solution for editing, scheduling, and distribution of displays operation
- Seamless management of different content for multiple displays
- With multi-channel content scheduling feature
- Ease of account management, content group and related admin options for better management

d. Streaming Media Player (6 units)

- Stream 4K content from smartphone / Tablet / PC / Mac  
Built-in Wi-Fi & Ethernet, Optimizes 4K & HDR content for TV Access

2. Audio system:

A. Ceiling Speaker (6 units)



- High-end 2-way Ceiling Speaker
- Conical dispersion: 140 degrees
- Max. Power: 120W
- RMS Power: 60W
- Impedance: 8  $\Omega$
- Sensitivity (1W/1m): 88 dB
- Sound Pressure (Max. W/1m): 106 dB
- Frequency Response ( $\pm 3$  dB): 55 Hz - 20 kHz
- Frequency Range (-10 dB): 44 Hz - 20 kHz
- Crossover: Passive built-in / Frequency: 3kHz
- Dispersion: Conical 140°
- Drivers: HF, 1" Aluminum membrane / LF, 6" Aluminum membrane
- Front finish: Thin edged white grill
- Mounting & handling: 4 Screw quick-fixing mechanism

#### B. Ceiling Subwoofers (2 units)

- Max. Power: 200W
- RMS Power: 100w
- Impedance: 8  $\Omega$
- Sound Pressure (Max. W/1m): 108 dB
- Connectors: Cable clamps
- Frequency Response ( $\pm 3$  dB): 50 Hz - 250 Hz
- Frequency Range (-10 dB): 28 Hz - 300 Hz
- Crossover Frequency: 250 Hz / Type: Passive built-in
- Dispersion Horizontal: 180° / Vertical: 180°
- Drivers: LF 10"
- Construction: ABS
- Front finish: White aluminum grill

#### C. Power Amplifier (1 unit)

- Quad-Channel
- Signal / Noise: > 95 dB
- THD+N (@ 1 kHz): < 0.05% (1/2 Rated Power)
- Crosstalk (@ 1 kHz): > 70 dB
- Common mode rejection ratio: 70 dB
- Damping factor: > 200
- Cooling: Temperature controlled FAN
- Operating temperature: 0° ~ 40° @ 95% Humidity
- Frequency Response ( $\pm 3$  dB): 20 Hz - 20 kHz

- Sensitivity (1W/1m): -19.5 dB ~ 27 dB
- Impedance: 10 kΩ balanced
- RMS Power: @ 4 Ω Stereo 4 x 350 W  
@ 8 Ω Stereo 4 x 220 W  
@ 8 Ω Bridge 2 x 700 W
- Inputs: Connector: XLR & 3-pin Euro Terminal Block (3.81 mm)
- Outputs: Connector: Speakon compatible & 2-pin Euro Terminal Block (5.08 mm)
- Power: Supply: Switching mode; Source: 230 ~ 240 V AC / 50 ~ 60 Hz

D. Mixing Console: (1 unit)

- 6-Channel with DFX
- Type: Live
- Controls Mono Mic and Line Input Channels: Gain, 3-band EQ (High, Mid, Low), AUX (DFX) Post, Channel Volume, pan
- Controls Stereo Line Input Channels: Channel Volume, Balance, AUX (DFX) Post, 2-band EQ (High, Low)
- Main section controls: Phones / Control Room Volume, Stereo Return Volume, DFX Mute Schalter, Phantom Power, DFX to Main Volume, 2-track Assignment (Main, Contr. Room), 2-track In Volume, Master Volume, DFX Presets
- Digital Effects Processor: Yes, 24-bit AD/DA Resolution
- Operating voltage: 18 V AC - 1 A, External PSU

3. Virtual Reality Box: (6 units)

- Stand-alone VR headset
- With high-resolution 2560 x 1440 graphics screen
- With built-in integrated spatial audio
- With Qualcomm Snapdragon CPU
- With standard 3.5 mm headphone jack
- With wireless controller: single trigger, trackpad, and a back and menu button.
- Field of View: 100 °
- Sensors: Orientational Tracking
- Material: Fabric, Plastic
- Globally known brand



	<p><u>4. Ethernet Switch: (1 unit)</u></p> <ul style="list-style-type: none"> <li>● 8-ports, Managed switch</li> </ul> <p><u>5. Laptop (for presentations): (1 unit)</u></p> <ul style="list-style-type: none"> <li>● Processor: Intel Core i7-7700HQ</li> <li>● Operating System: Windows 10</li> <li>● Memory: 8GB</li> <li>● Graphics Card: GTX1050 4GB</li> <li>● Storage: 1 TB + 128 GB SSD</li> <li>● Display size: 15" FHD</li> </ul>		
	<p><b><u>V. PA/BGM SYSTEM</u></b></p> <p><u>1. In-Ceiling Loud Speaker: (25 units)</u></p> <ul style="list-style-type: none"> <li>● 2-way coaxial</li> <li>● RMS Power: 40 W</li> <li>● Sensitivity (1W/1m): 94 dB</li> <li>● Sound Pressure (Max. W/1m): 112 dB</li> <li>● Dispersion: 130° (Half space (flush mounted in ceiling), average 100 Hz to 10 kHz @ -6 dB) Range (-10 dB) 55 Hz – 16 KHz</li> <li>● Construction: ABS</li> <li>● Mounting &amp; Handling: Quick-fit installation system</li> </ul> <p><u>2. Digital Paging Microphone: (1 unit)</u></p> <ul style="list-style-type: none"> <li>● Polar Pattern: Cardioid (unidirectional)</li> <li>● Sensitivity (1W/1m): -42 dB</li> <li>● Level &amp; status indication LEDs</li> <li>● Internal Storage: 10-minute audio or messages spread over max of 30 files.</li> <li>● Gooseneck type</li> <li>● Connection Standard: TIA/EIA T568B</li> <li>● Connectors: RJ45 (data + power)</li> </ul> <p><u>3. All-in-one Digital Audio Player: (1 unit)</u></p> <ul style="list-style-type: none"> <li>● Control Front panel, RS-232</li> <li>● Inputs: CD loader, USB memory drive, SD/MMC memory card</li> </ul>		



	<ul style="list-style-type: none"> <li>• Outputs: Tuner audio, CD/MP3, Selectable audio (variable level)</li> <li>• Frequency response: (<math>\pm 3</math>dB) 20 Hz – 20 kHz</li> <li>• Tuning range: FM 87.5 ~ 108 MHz / MW 522 ~ 1620 kHz</li> <li>• Supported file types: Playback, WAV, MP3, WMA</li> <li>• Power Source: 110 ~ 240 V AC / 50 ~ 60 Hz</li> </ul> <p><u>4. Power Conditioner: (1 unit)</u></p> <ul style="list-style-type: none"> <li>• 19" / 1U</li> <li>• Protection Against Impulse Voltage - neutral conductor to earth, outer conductor to neutral, outer conductors to protection light</li> <li>• Max. Surge Current 6000A (8x20 <math>\mu</math>s pulse)</li> <li>• Max. Surge Energy 70 joules per contact</li> <li>• Noise Cancelling &lt;20 dB, 1.5 MHz-200 MHz</li> <li>• Response Time 1 ns</li> </ul> <p><u>5. Multi-zone Audio Matrix: (1 unit)</u></p> <ul style="list-style-type: none"> <li>• 4-Zone</li> <li>• Two balanced microphone inputs with priority function</li> <li>• Phantom power possibility</li> <li>• Three-band tone control</li> <li>• With four stereo line-level inputs</li> <li>• Control: RS232, Front panels, Web-based interface, free app for smart devices, RJ45</li> <li>• Outputs: Impedance – 45 ohms; Level - -70 dB ~ 0 dB</li> <li>• Frequency Response: 20 Hz – 20 kHz</li> <li>• Power: Consumption – 12 W; Supply – 100 – 240 V AC / 50~60 Hz, 24 V DC (emergency power)</li> </ul> <p><u>6. Power Amplifier: (1 unit)</u></p> <ul style="list-style-type: none"> <li>• RMS Power: 240W</li> <li>• Signal / Noise: &gt;90 dB</li> <li>• Cooling: Dual speed controlled fan</li> <li>• Protection: DC short circuit, Overheating, Over load, Signal limiting</li> <li>• Power Supply: Conventional (transformer)</li> <li>• Inputs: Sensitivity (1W/1m): -12 dB ~ 0 dB Impedance: 10kohm balanced Connector: XLR female</li> </ul>		
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	<ul style="list-style-type: none"> <li>• Outputs: Voltage/Impedance 100V/42 ohms, 70V/21ohms, 31V/4ohms</li> </ul> <p><u>7. Metallic Equipment Rack (1 set): 10 RU</u></p>		
	<p><b><u>VI. GENERAL SERVICES</u></b></p> <ol style="list-style-type: none"> <li>1. Supply, Delivery, and Installation of IMC pipes, Display brackets, Pullboxes, Speaker wires and brackets, Signal cables, Connectors, Patch panel, Hangers/supports, Junction boxes, Screws, Nuts and bolts, End-connectors and other Hardware materials. Roughing-ins, Misc. and other accessories to complete the installation. Includes labor, such as masonry, carpentry, and drilling works.</li> <li>2. Mobilization/Demobilization, Tools, Installation, Meetings, Drawings, Programming, Tuning, Calibration, Testing &amp; Commissioning, Engineering Supervision.</li> <li>3. In-house Technical Support for 15 days upon commissioning.</li> </ol>		
	<p><b><u>VI. Training / Knowledge Transfer</u></b></p> <ul style="list-style-type: none"> <li>• The winning bidder must provide Technology Transfer for two (2) or more IT personnel and/or BCDA end-users after commissioning.</li> <li>• The winning bidder must provide Trainings for video conferencing solution, content management system and control systems and other.</li> </ul>		
	<p><b><u>VII. Documentation</u></b></p> <ul style="list-style-type: none"> <li>• The winning bidder must provide: <ol style="list-style-type: none"> <li>1. User and system manuals,</li> <li>2. As-Built-Plan,</li> <li>3. Technical materials,</li> <li>4. Documented step-by-step procedure,</li> <li>5. Complete documentation of the hardware appliance, utility and other applications,</li> <li>6. Inventory of all devices and serial numbers.</li> </ol> </li> </ul>		
	<p><b><u>VIII. Warranty and Support</u></b></p> <ul style="list-style-type: none"> <li>• All Video Displays shall cover a warranty of 3 years (labor and parts).</li> </ul>		



	<ul style="list-style-type: none"> <li>• Speakers and major hardware appliance shall cover a warranty of 1 year.</li> <li>• Warranty must include firmware updates, software patches, and driver updates, if available, during the duration of the warranty.</li> <li>• On-call support shall be available during office hours. A two (2) hours response time of the call (through telephone call) shall be provided. Onsite support must have a response time of not more than four (4) hours from the time of the call in case where in the phone support could not solve the problem.</li> <li>• The winning bidder must provide procedures on support and problem escalation.</li> <li>• Full replacement of defective unit/s should be <b>30 working days</b> from receipt of notice. If full replacement is not yet possible, a service unit shall be provided by the supplier within 48 hours from receipt of notice of defective unit.</li> </ul>		
	<p><b><u>IX. Certificates</u></b></p> <ul style="list-style-type: none"> <li>• As built plan, must be duly signed by authorized Professional Electronics Engineer (PECE).</li> <li>• As built plan, must be validated with an in-housed or outsourced licensed Professional ECE at the bidder's cost.</li> </ul>		
	<p><b><u>X. Notes</u></b></p> <ul style="list-style-type: none"> <li>• All specifications are minimum requirements. Proponents may propose equivalent or higher specifications.</li> <li>• The obligation for the warranty shall be covered by Retention money in an amount equivalent to at least one percent (1%) of every progress payment. The said amounts shall only be released after the lapse of the warranty period indicated per item of the TOR.</li> </ul>		

**Bidder's Authorized Representative:**

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**Signature over Printed Name**

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**Principal Bidder / Supplier**