

**REQUEST FOR COMMENTS OF STAKEHOLDERS/OEM/FIRMS
ON QRS (QUALITY REQUIREMENT) & TDS (TRIAL DIRECTIVES)
OF VIRTUAL CLASS ROOM**

1. The proposed QRs/TDs of VIRTUAL CLASS ROOM is attached as **Appendix 'A & B'**. The OEMs/Vendors are requested to forward information of the product which they can offer and also forward correct specifications of their system against each parameter. Complied or not complied remarks will not be accepted.

2. The required information/details may please be forwarded at the following addresses by **12th March 2019**.

Directorate General CRPF

East Block-7, Sec-1, R.K. Puram, New Delhi-110066

Email: comncell@crpf.gov.in

3. An early response is requested.

QRs of Virtual Class Room

Virtual Class room should have the below mentioned features and functionalities:

- a. Ultra-Immersive Learning and Training Virtual Classroom with video stream having (student capacity-as per user requirement) Nos of seats Training/Learning Room/Seminar Hall.
- b. Number of sites connectivity as required by user for Virtual class room.
- c. Point to Point (P2P)
- d. Point to Multipoint (P2MP)
- e. End-to-End secure communication between all locations with VC endpoints.
- f. Two-way interactive discussion between any two-given locations across user network.
- g. Multiple-way interactive discussion between multiple locations in a single VC call.
- h. Provision to share content during video/audio call any time, any VC device from any location during P2P and P2MP calls via following methods:-
 - i) HDMI cable
 - ii) VGA cable with 3.5mm stereo input
 - iii) Wireless content sharing device (AirPlay, Miracast) or equivalent solution.

| S. N. | Parameter | Specification | Remarks |
|-------|-----------------------------------|--|---------|
| 1 | VIDEO CONFERNING CODEC | | |
| a | Package | Full High Definition Video Conferencing Codec | |
| b | Video Standards and Resolutions | It should support H.323 & SIP standards for communications. | |
| | | It should support interoperability and bandwidth saving using video compression H.261, H.263, H.264 AVC, H.264 SVC, H.264 High Profile/H.265 | |
| | | It should support 1080p60 fps, 1080p30 fps, 720p60fps, 720p30fps & 4CIF. | |
| c | Content Standards and Resolutions | It should support content sharing using standard based H.239 & BFCP. It should also support audio from PC used for content sharing. | |
| | | It should transmit both people and content both simultaneously to the far end location at 1080p 60fps | |

| S. N. | Parameter | Specification | Remarks |
|-------|------------------------------|--|---------|
| d | Audio Standards and Features | It should support G.711, G.728, G.729A, G.722, G.722.1, AAC-LD or better | |
| | | It should support 20kHz or better bandwidth with crystal clear audio and stereo sound. | |
| | | Automatic Gain Control and Automatic Noise Suppression | |
| | | Keyboard noise reduction and instant adaptation echo cancellation | |
| e | Video and Audio Inputs | 2 x HDMI/HDCI input for connecting 2 Full HD cameras | |
| | | 1 x HDMI/DVI input to share FHD content from PC/Laptop/Document camera. | |
| | | 1 x VGA input for content sharing through PC/Laptop | |
| | | 1 x Microphone Inputs to support minimum 4 ceiling microphones. | |
| | | 2 x RCA/3.5mm stereo line-in | |
| f | Video and Audio Outputs | 2 x HDMI output for connecting main monitor & second monitor. | |
| | | 1 x HDMI output for connecting third monitor or conference recording using local DVR. | |
| | | 1 x RCA/3.5 mm stereo line-out | |
| g | Other Interfaces | 1 x 10/100/1000 LAN port | |
| | | 2 x USB for software upgrade and connecting external devices | |
| | | 1 x RS-232 DB9 or equivalent | |
| h | Network Features | H.323 and SIP bandwidth up to 6 Mbps | |
| | | IPv4 and IPv6 support from day one | |
| | | Auto Gatekeeper Discovery, IP Precedence & QoS with support for H.323 based lost packet recovery. | |
| i | Multisite Feature | It should support inbuilt multiparty feature with support for 1+5 or more sites at 720p through additional license from day one. | |
| j | Security | Media Encryption (H.323, SIP): AES-128, AES-256 | |
| | | Authenticated access to admin menus, web interface and telnet API | |
| | | Local account password policy configuration | |
| | | Global Directory/Centralized Directory/LDAP support | |

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| k | Other Standards/features | H224/H.281, H.323 Annex Q, H.225, H.245, H.241, H.239, H.243, H.460 | |
| 2 | Video Conferencing Camera (For capturing White Board) (Optional):- Qty as per user requirement | | |
| a. | Camera Type | 1/2.33" CMOS or better, 1920 x 1080, 60/50 fps | |
| b. | Zoom | Minimum 10X Optical | |
| c. | Horizontal & Vertical Field of View | Horizontal FOV : 65° or more, Vertical FOV : 39° or more | |
| d. | Pan, Tilt Range | Pan: +/-100° or more, Tilt: +20/-30° or better | |
| e. | Min. illumination and Exposure | Minimum 50 Lux, Auto-iris, AGC | |
| f. | The camera should be from the same OEM as the VC codec for complete interoperability. | | |
| 3 | Automatic Speaker Tracking Camera (For tracking Trainer and Trainee) (Qty as per user requirement) | | |
| Standard Features | | Should be compatible with the OEM camera provided with Base VC system. | |
| | | The system should be capable to automatically zoom in on an active speaker at least 30 feet or more distance from the VC Camera system. | |
| | | It should be possible to connect such two such systems via Cascading Mode to ensure every part of the meeting room participants can be focused on to find the appropriate active speaker. | |
| | | The system should be capable to show a single stream video of both the active speaker and everyone in the room in a PIP view. | |
| | | The system should have an option to turn the PIP view off. | |
| | | The system should be able to produce data listing the number of participants at the beginning, middle, and end of the VC call. | |
| | | The system should provide an option to turn ON or OFF this feature. | |
| | | The device should be from the same OEM as the VC codec for complete interoperability. | |

| S.N. | Parameter | Specification | Remarks |
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| 4 | | Tabletop Microphone (Optional):- Qty as per user requirement | |
| | Standard Features | It should offer consistent, reliable, 360-degree voice pickup. | |
| | | It should support 22 kHz of high-fidelity audio. | |
| | | Audio cable should be supplied with each microphone. | |
| | | The microphone should have additional port for connecting another microphone in cascading mode. | |
| | | Lighted button for Mute indication | |
| | | The microphone should be capable to getting directly connected to the VC codec with a digital interface connection. | |
| | | The microphone should be from the same OEM as the VC codec. | |
| 5 | | Ceiling Mounted Microphones (Optional):- Qty as per user requirement | |
| | Standard Features | The ceiling microphone system should be supplied with all cables and accessories to mount the system on a false ceiling in a VC meeting room. | |
| | | It should offer consistent, reliable, 360-degree voice pickup. | |
| | | It should be a digital microphone with three cardioid elements per microphone – elements spaced 120 degrees apart | |
| | | Total coverage area for one ceiling microphone should be at least 350 square feet or more. | |
| | | The ceiling microphone should be capable to getting connected in cascading mode (up to 4 microphones). | |
| | | The ceiling microphone should be capable to getting directly connected with a digital interface connection to Video Conferencing Codec/Digital Audio Signal Processor | |
| | | The device should be from the same OEM as the VC codec for complete interoperability. | |

| S. N. | Parameter | Specification | Remarks |
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| 6 | Digital Audio Signal Processor (Optional):- Qty as per user requirement | | |
| | Standard Features | The device should come with 16 Inputs and 16 Outputs. | |
| | | Should support 22kHz bandwidth stereo AEC on all input channels. | |
| | | 10-bands of parametric or up to 31-bands graphic EQ. | |
| | | It should provide complete control of devices over built-in Ethernet or RS-232 | |
| | | Should be compatible with both digital Ceiling Microphone arrays and traditional analog microphones. | |
| | | Should have an option to cascade multiple DSP to support more audio inputs and outputs. | |
| | | Optional modular telephony interface cards (single or dual-line PSTN, or VoIP telephony cards) should be available to expand the functionality. | |
| | | Seamless integration with VC Codec | |
| 7 | Wireless Content Sharing Device (Optional):- Qty as per user requirement | | |
| | Standard Features | It should be possible to share multiple (up to 4 simultaneously) | |
| | | Content input/resolution: <ul style="list-style-type: none"> ▪ 1 x HDMI/4K, 30fps ▪ Airplay 1080p, 30fps ▪ Miracast 1080p, 30fps Content output/resolution: <ul style="list-style-type: none"> ▪ 1 x HDMI/4K, 60fps. RGB444 | |
| | | Should support content interaction and annotation when connected to a touch enabled display. It should provide an option to save the annotated content. | |
| | | Should have a 3.5mm audio output port | |
| | | Should have dual network connectivity support: <ul style="list-style-type: none"> ▪ 1X Ethernet 10/100/1000 ▪ 802.11ac Wi-Fi wireless networking; IEEE 802.11a/b/g/n compatible | |
| | | Should support auto-sensing PoE+ or power through dedicated adapter. | |

| S.N. | Specification/Parameter | Remarks |
|-----------|---|---------|
| 8 | 84"/85"/86" 4K LED Display (Optional) :- Nos and size of display as per user requirement | |
| | a) Resolution: 3840x2160 4K Ultra HD | |
| | b) Contrast Ratio: 1200:1 or higher | |
| | c) Brightness: 400 cd/m ² or higher | |
| | d) Viewing Angle (Horizontal/ Vertical): 178° / 178° | |
| | e) 2 HDMI or more | |
| | f) Ethernet or RS-232 connectivity | |
| | g) Certification | |
| 9 | 65" 4K LED Display (Optional) :- Nos of display as per user requirement | |
| | a. Resolution: 3840x2160 4K Ultra HD | |
| | b. Contrast Ratio: 1200:1 or higher | |
| | c. Brightness: 500 cd/m ² or higher | |
| | d. Viewing Angle (Horizontal/ Vertical): 178° / 178° | |
| | e. 2 HDMI or more | |
| | f. Ethernet or RS-232 connectivity | |
| | g) Certification | |
| 10 | 55" 4K LED Display (Optional) :- Nos of display as per user requirement | |
| | a. Resolution: 3840x2160 4K Ultra HD | |
| | b. Contrast Ratio: 1200:1 or higher | |
| | c. Brightness: 500 cd/m ² or higher | |
| | d. Viewing Angle (Horizontal/ Vertical): 178° / 178° | |
| | e. 2 HDMI or more | |
| | f. Ethernet or RS-232 connectivity | |
| | g) Certification | |

| S.N. | Specification/Parameter | | Remarks |
|-----------|---|---------------------|---------|
| 11 | 55"/65"/84"/85"/86" LCD/LED touch/interactive anti-glare Display Panel (Optional) :- Nos and size of interactive display as per user requirement | | |
| a. | Resolution: 3840x2160 4K Ultra HD | | |
| b. | Contrast Ratio: 1200:1 | | |
| c. | Viewing Angle (Horizontal / Vertical): 178° / 178° | | |
| d. | 2 HDMI and 1 DP (USB ports as per requirement) with audio connectivity | | |
| e. | Ethernet or RS 232 connectivity | | |
| f. | Brightness: 350 cd/m ² or higher | | |
| g. | Tempered glass with Anti-glare coating | | |
| h. | Certification | | |
| i. | Built in touch points: Minimum 10 point touch | | |
| 12 | Touch enabled content monitor with annotation for trainees (Optional):- Qty as per user requirement | | |
| a. | Screen Size | 15" or more | |
| b. | Resolution | 1920x1080 (full HD) | |
| c. | Connectivity | RS-485/RS232 | |
| d. | Annotation capability | Available | |
| e. | White boarding | Available | |
| f. | Input connectivity | VGA/HDMI, USB Port | |

| S.N. | Parameter | Specification | Remarks |
|-----------|---|--|---------|
| 13 | Ceiling Document Camera (Optional):- Qty as per user requirement | | |
| a. | Shooting Area | A minimum of 380X285 mm shooting area or better | |
| b. | Zoom | It should have a 20X optical zoom or better | |
| c. | Focus | It should have Auto/Manual Focus option. | |
| d. | Image Sensor | It should have a 1/3" Image Sensor | |
| e. | Total Pixel | It should have a minimum of 5,000,000 or better | |
| f. | Resolution | It should have ≥1000TV line or more | |
| g. | Image Save | SD card or better | |
| h. | Signal Support | It should support the following resolutions: 1024×768, 1280×1024, 1280×720, 1920×1080 or more. | |
| i. | White Balance | It should have option of Auto/Manual White Balance. | |
| j. | Multimedia Function | It should have the following Functions: Color/BW, negative, mirror, rotate, text/graphic, brightness control, freeze, preview/shooting, electric volume control, split screen, RGB3×2 matrix | |
| k. | RS-232 Input | It should have RS-232 Port for Control or could be optional | |
| l. | Control Modes | Following Control Options are required, Control Panel; Remote Controller; RS-232 Control or better | |
| m. | Laser mark | Should be available | |

| S.N. | Parameter | Specification | Remarks |
|-----------|--|---|---------|
| 14 | Speakers and Power Amplifier (Optional):- Qty as per user requirement | | |
| a | Ceiling Speakers | | |
| | Frequency Range (-10dB) | 80 Hz - 20 kHz | |
| | Power Capacity | 80 Watts Continuous Program Power 40 Watts Continuous Pink Noise | |
| | Nominal Coverage | 130° Conical Coverage | |
| | Nominal Sensitivity | 86 dB SPL, 1W @ 1 m (3.3ft) | |
| | Maximum SPL @ 1m: | 102dB | |
| | Nominal Impedance | 16 ohms | |
| b | FOH Speakers | | |
| | Frequency Range (-10dB) | 60 Hz - 20 kHz | |
| | Power Capacity | 200 Watts Continuous Program Power 100 Watts Continuous Pink Noise | |
| | Coverage Angle | 100° x 100° Coverage | |
| | Nominal Sensitivity | 90 dB SPL, 1W @ 1 m (3.3ft) | |
| | Maximum SPL @ 1m | 110 dB | |
| | Nominal Impedance | 8 Ohms | |
| c | Power Amplifier | | |
| a. | Rated Output Power | Min. 100 Watts per channel @ 8Ω | |
| b. | Number of channels | 2 Channels | |
| c. | Sensitivity | 1.4V | |
| d. | Input Impedance | 20.0 KΩ | |
| e. | Signal-to-Noise Ratio | >97 dB | |
| f. | Total Harmonic Distortion (THD) | < 0.5% | |

| S.N. | Parameter | Specification | Remarks |
|-----------|---|---|---------|
| 15 | PODIUM (Optional):- Qty as per user requirement | | |
| a. | Metallic Smart Podium Should have - | | |
| b. | Built-in 19" LCD Tablet touch screen Monitor with Viewing angle adjustment | | |
| c. | Integrated PC, with minimum i5 processor, Windows 7 or latest OS | | |
| d. | Keyboard tray | | |
| e. | Cooling Fan | | |
| f. | 19" Rack shelves and drawer | | |
| g. | Built-in Gooseneck Microphone | | |
| h. | Wireless Microphone | | |
| i. | USB Port: Minimum 3 Nos, HDMI port & LAN port. | | |
| 16 | Gooseneck Microphones for local speech re-enforcement of Trainees (Optional):- Qty as per user requirement | | |
| | The Microphone should have a frequency response of 40 Hz to 17,000 Hz or better. | | |
| | The Microphone should have a Cardioids Polar Pattern. | | |
| | The Microphone should come up with standard 3 PIN XLR Connector. | | |
| | The Cartridge should be a 20mm Condenser | | |
| 17 | Wireless Lapel/ Head worn Microphone (Optional):- Qty as per user requirement | | |
| | The Microphone should have Frequency band of UHF 900 MHz~ or better. | | |
| | The microphone should have at least Step 8 Digital Variable Squelch Control Method | | |
| | The microphone should have a ± 10 ppm Frequency Stability. | | |
| | The microphone should have Auto Scan Receive Mode. | | |
| | The Microphone should have a frequency response of 40Hz to 17000 Hz or better. | | |
| 18 | Central Infrastructure – Minimum 15 Ports MCU Solution (Optional):- Qty as per user requirement | | |
| i | Hardware | The MCU must be a dedicated hardware-based solution from the same OEM as the endpoint. | |
| | | The MCU should support Redundant Power Supply. | |
| ii | Capacity | The solution must support 15 HD1080p30 ports. It must be scalable to support 50 HD1080p30 ports on the same box/server by adding additional licenses only & without the need to add hardware and cascading. | |

| S.N | Parameter | Specification | Remarks |
|-----|--------------------|--|---------|
| | | <p>There must not be any artificial limits imposed in terms of number of conference rooms/concurrent conferences. Keeping future scalability into consideration, the number of concurrent conferences must be equal to at least the port capacity being asked for. Additionally, it should be possible to pre assign 100 meeting rooms dedicated for end users.</p> | |
| | | <p>It must be possible to see at least 20 sites simultaneously on the screen. The end points must have the capability to change their local video layout from remote control. The MCU must support 25 layouts.</p> | |
| iii | Resolution support | <p>The MCU must support resolutions up to 1080p60.</p> | |
| iv | Other components | <p>The solution must have native support for H.323 & SIP with the ability of 100 devices registration for H.323 gatekeeper and SIP registrar from day 1. The number of concurrent calls supported must be 15 from day 1 and be scalable to 100 on the same server by through software license. This must be a dedicated, physically separate server to avoid a single point of failure.</p> <p>The solution must include a management, scheduling and provisioning component(s) with capacity of at least 100 devices.</p> <p>This must be a dedicated, physically separate server to avoid a single point of failure.</p> <p>The management system should support provisioning, bandwidth & device management/software upgrade and scheduling of 3rd party video endpoints in addition to the video endpoints of the OEM of the management server.</p> | |

| S.N | Parameter | Specification | Remarks |
|-----|-------------------------------|--|---------|
| | | It must be possible to have an Integrated presence-awareness feature that allows users to verify contact availability and status, and seamless enterprise directory integration which simplifies management and ensures contact list accuracy. | |
| | | The solution must include a firewall traversal component for SIP & H.323 video endpoints. It must support at least 15 calls. This must be a dedicate, physically separate server to avoid a single point of failure. Should support firewall traversal solution using the H.460 and SIP protocol. | |
| | | The solution must include the ability to allow calls from smart phones, tablets and PCs/laptops. | |
| v | Protocols | <p>The solution must support H.261, H.263, H.264 AVC, H.264 SVC, H.264 High Profile/H.265</p> <p>The MCU should support content sharing using standard based H.239 and BFCP over H.323 & SIP to up to HD1080 30fps resolution.</p> <p>All components of the solution must support H.323 and SIP from day 1.</p> <p>It should support G.711, G.729A, G.722, G.722.1, AAC-LD or better</p> <p>It should support 20kHz bandwidth with crystal clear audio and stereo sound.</p> <p>The MCU must support Lecture Mode, Presentation Mode & Far End Camera Control.</p> <p>Automatic Gain Control and Automatic Noise Suppression</p> | |
| vi | Security | The solution must support encryption on H.323, SIP and H.320. | |
| vii | Interoperability | <p>The solution must be interoperable with standards-based end points, even if they are from a different OEM for all the video ports. Any hardware required to interoperability should be supplied from day one.</p> <p>The solution must support both dial-in and dial-out of calls.</p> | |
| 19 | Cables and Connectors: | Input/output panels for video, audio & network cabling like HDMI/VGA/PC Audio/Speaker/Control/Microphone/Ethernet/USB etc. | |

| S.N | Parameter | Specification | Remarks |
|------------|--|----------------------|----------------|
| 20 | Lighting system for virtual class room. ((Optional):- as per requirement | | |
| 21 | Switching & Distribution System: Required Switching & Distribution System for establishing the virtual class room. | | |
| 22 | Room Interiors (Carpeting, Wall Panelling, Acoustic Ceiling) (Optional):- as per requirement | | |
| 23 | Furniture: Chairs & Tables (Optional: Qty as per user requirement) | | |
| 24 | Online UPS 5/7.5/10 or higher capacity (Optional):- Nos and capacity of UPS as per user requirement | | |
| 25 | Air Conditioning: AC Type, Capacity & Quantity decided by user (Optional) | | |

Optional features may be incorporated by the user agency

| S. N | Detailed Description | Technical Requirement (Virtual Classroom Set Up) | Remarks |
|-------------|---|---|----------------|
| 1 | Room Design & Furniture Real Estate Setup | <ul style="list-style-type: none"> • The training room should be designed in a manner that the trainer is centrally positioned to all the trainees/attendees present locally in the suite and everybody sits directly facing the trainer. • The trainer should be able to see all the trainees present locally all the time. • The trainer lectern should be placed in a manner that it is not acting as an obstruction for the trainees available locally and they are able to see trainer always in the most effective manner from anywhere in the room. • The lectern should be designed in a manner that it is providing an effective front drop to give the appearance of the distant trainer as if he/she is present locally behind the lectern. • The lectern should have in-built equipment rack with silent fans for cooling mechanism. • The trainee tables should be designed in a manner so that all the trainees seated should always be visible to the trainer from the lectern. • The same special design on the table should also house the gooseneck microphones along with the speakers, the way on table content monitors are installed. • The trainee table should house all the above mentioned items however still no obstruction between the trainer and the trainees. • The trainees table should be designed in a manner so that no liquid spillage should damage any equipment in the setup. • The design of the table(s) in Training Room should be such that no wires or cables are visible neither on the table nor at the legs of the tables. • Bidder to provide complete Virtual Classroom interiors design including design of the tables, walls as well as the ceiling design. • The Virtual Classroom design should be such that it is optimized for local trainings, Distance Ultra Immersive Video training and Distance | |

| | | | |
|---|--|--|--|
| | | <p>Ultra Immersive Video learning without compromising the quality of training and interaction in any ways.</p> <ul style="list-style-type: none"> • Erection and fabrication of the rooms - Only bare shell space would be provided with raw power. Bidder to erect entire partitions, interiors including joinery, all furniture, carpeting, false ceilings, | |
| 2 | <p><u>Local Training/Local seminar/Local conference Room Experience</u></p> | <ul style="list-style-type: none"> • The trainer should be able to select the local training mode with all the local training required back-end equipment. • The trainer should be able to share content over laptop and document during local meeting/local training. • The trainer should be able to annotate/highlight on the content monitor provided to him on his lectern. • The annotated/highlighted screen work out should be visible to all the trainees on their table content monitors and are also visible on the front interactive displays. • The annotation/highlighting on the content monitor should not be asking the user to upload software or to connect a laptop with USB connections neither any special pen/stylus should be required and just by using finger all capabilities should be achieved. • The trainees also should be empowered to annotate and highlight on the content monitor, which is provided to him/her on the table, in order to ask any question and to clear any doubt. • The trainer should be able to open a whiteboard/blackboard on the content monitor. • The shared work on the table whiteboard of the trainer should be visible to all the trainees' table content monitors as well as the front interactive displays. • The content monitors should be adjustable to go back by 150 degrees so that they don't act as an obstruction on the table/on the trainer lectern. • The trainees should be able to write on the same white board which the trainer wrote on/used without physically going to the whiteboard. • The annotated/highlighted content on the | |

| | | | |
|---|---|---|--|
| | | <p>whiteboard should get saved with a simple touch on the content monitor.</p> <ul style="list-style-type: none"> • The whiteboard on the table should be extendable to multiple screens so that the user can work on them and with one touch, all the different whiteboard screen extensions shrink to become one whiteboard. <p>The trainer apart from annotation on the content monitor should also be able to annotate/highlight on the front interactive displays all by double tapping on the screens without using any pen, just by using the fingers</p> | |
| 3 | <p>Audio Experience During Local Training / Seminars / Conferences & During Video Collaborative Sessions</p> | <ul style="list-style-type: none"> • The room should have front of the house speakers for the spatial presentation audio which will be audible across all the corners of the room. • The trainees should be provided with most effective on table local speech reinforcement solution so that everyone is able to hear each other very clearly during the local training. • For local speech reinforcement, the trainees should be provided with on table gooseneck microphones along with the speakers for the same. • The audio of the trainer should be uniformly spatial for the same location across all the trainees. • All the trainees should be heard crystal clear by the local trainees irrespective of place they are sitting in the room. • During Video training the trainer voice should be easily send across the other sites without shouting. • The near site trainees and far site trainees during this session should feel as if they are in the same room. <p>The far site audio of the video participants should come from the front speakers in a manner as they are present there.</p> | |

TDs of Virtual Class Room

Virtual Class room should have the below mentioned features and functionalities:

- a. Ultra-Immersive Learning and Training Virtual Classroom with video stream having (student capacity-as per user requirement) Nos of seats Training/Learning Room/Seminar Hall.
- b. Number of sites connectivity as required by user for Virtual class room.
- c. Point to Point (P2P)
- d. Point to Multipoint (P2MP)
- e. End-to-End secure communication between all locations with VC endpoints.
- f. Two-way interactive discussion between any two-given locations across user network.
- g. Multiple-way interactive discussion between multiple locations in a single VC call.
- h. Provision to share content during video/audio call any time, any VC device from any location during P2P and P2MP calls via following methods:-
 - i) HDMI cable
 - ii) VGA cable with 3.5mm stereo input
 - iii) Wireless content sharing device (AirPlay, Miracast) or equivalent solution.

| S. N. | Parameter | Specification | Trial Directives |
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| 1 | VIDEO CONFERNING CODEC | | |
| a | Package | Full High Definition Video Conferencing Codec | Board will check practically. |
| b | Video Standards and Resolutions | It should support H.323 & SIP standards for communications. It should support interoperability and bandwidth saving using video compression H.261, H.263, H.264 AVC, H.264 SVC, H.264 High Profile/H.265 It should support 1080p60 fps, 1080p30 fps, 720p60fps, 720p30fps & 4CIF. | Board will check practically and firm will submit OEM certificate for protocols. |
| c | Content Standards and Resolutions | It should support content sharing using standard based H.239 & BFCP. It should also support audio from PC used for content sharing. It should transmit both people and content both simultaneously to the far end location at 1080p 60fps | Board will check practically and firm will submit OEM certificate for protocols. |

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| | | Automatic Gain Control and Automatic Noise Suppression | |
| | | Keyboard noise reduction and instant adaptation echo cancellation | |
| e | Video and Audio Inputs | 2 x HDMI/HDCI input for connecting 2 Full HD cameras | Board will check practically |
| | | 1 x HDMI/DVI input to share FHD content from PC/Laptop/Document camera. | |
| | | 1 x VGA input for content sharing through PC/Laptop | |
| | | 1 x Microphone Inputs to support minimum 4 ceiling microphones. | |
| | | 2 x RCA/3.5mm stereo line-in | |
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| | | 1 x RS-232 DB9 or equivalent | |
| h | Network Features | H.323 and SIP bandwidth up to 6 Mbps | Board will check practically and firm will submit OEM certificate for protocols |
| | | IPv4 and IPv6 support from day one | |
| | | Auto Gatekeeper Discovery, IP Precedence & QoS with support for H.323 based lost packet recovery. | |
| i | Multisite Feature | It should support inbuilt multiparty feature with support for 1+5 or more sites at 720p through additional license from day one. | Board will check practically |
| j | Security | Media Encryption (H.323, SIP): AES-128, AES-256 | Board will check practically and firm will submit OEM certificate for Media Encryption. |
| | | Authenticated access to admin menus, web interface and telnet API | |
| | | Local account password policy configuration | |
| | | Global Directory/Centralized Directory/ LDAP support | |

| S. N. | Parameter | Specification | Trial Directives |
|-------------------|---|---|-----------------------------------|
| k | Other Standards/features | H224/H.281, H.323 Annex Q, H.225, H.245, H.241, H.239, H.243, H.460 | Firm will submit OEM certificate. |
| 2 | Video Conferencing Camera (For capturing White Board) (Optional):- Qty as per user requirement | | |
| a. | Camera Type | 1/2.33" CMOS or better, 1920 x 1080, 60/50 fps | Firm will submit OEM certificate |
| b. | Zoom | Minimum 10X Optical | Board will check practically |
| c. | Horizontal & Vertical Field of View | Horizontal FOV : 65° or more, Vertical FOV : 39° or more | Board will check practically |
| d. | Pan, Tilt Range | Pan: +/-100° or more, Tilt: +20/-30° or better | Board will check practically |
| e. | Min. illumination and Exposure | Minimum 50 Lux, Auto-iris, AGC | Board will check practically |
| f. | The camera should be from the same OEM as the VC codec for complete interoperability. | | Board will check practically. |
| 3 | Automatic Speaker Tracking Camera (For tracking Trainer and Trainee) (Qty as per user requirement) | | |
| Standard Features | Should be compatible with the OEM camera provided with Base VC system. | | Board will check practically. |
| | The system should be capable to automatically zoom in on an active speaker at least 30 feet or more distance from the VC Camera system. | | Board will check practically. |
| | It should be possible to connect such two such systems via Cascading Mode to ensure every part of the meeting room participants can be focused on to find the appropriate active speaker. | | Board will check practically. |
| | The system should be capable to show a single stream video of both the active speaker and everyone in the room in a PIP view. | | Board will check practically. |
| | The system should have an option to turn the PIP view off. | | Board will check practically. |
| | The system should be able to produce data listing the number of participants at the beginning, middle, and end of the VC call. | | Board will check practically. |
| | The system should provide an option to turn ON or OFF this feature. | | Board will check practically. |
| | The device should be from the same OEM as the VC codec for complete interoperability. | | Board will check practically |

| S.N. | Parameter | Specification | Trial Directive |
|----------|---|---|--|
| 4 | Tabletop Microphone (Optional):- Qty as per user requirement | | |
| | Standard Features | It should offer consistent, reliable, 360-degree voice pickup. | Board will check practically |
| | | It should support 22 kHz of high-fidelity audio. | Firm will submit OEM certificate |
| | | Audio cable should be supplied with each microphone. | Board will check practically |
| | | The microphone should have additional port for connecting another microphone in cascading mode. | Board will check practically |
| | | Lighted button for Mute indication | Board will check practically |
| | | The microphone should be capable to getting directly connected to the VC codec with a digital interface connection. | Board will check practically |
| | | The microphone should be from the same OEM as the VC codec. | Board will check practically |
| 5 | Ceiling Mounted Microphones (Optional):- Qty as per user requirement | | |
| | Standard Features | The ceiling microphone system should be supplied with all cables and accessories to mount the system on a false ceiling in a VC meeting room. | Board will check practically. |
| | | It should offer consistent, reliable, 360-degree voice pickup. | Board will check practically. |
| | | It should be a digital microphone with three cardioid elements per microphone – elements spaced 120 degrees apart | Firm will submit OEM certificate. |
| | | Total coverage area for one ceiling microphone should be at least 350 square feet or more. | Firm will submit OEM certificate/Datasheet |
| | | The ceiling microphone should be capable to getting connected in cascading mode (up to 4 microphones). | Board will check practically. |
| | | The ceiling microphone should be capable to getting directly connected with a digital interface connection to Video Conferencing Codec/Digital Audio Signal Processor | Board will check practically. |
| | | The device should be from the same OEM as the VC codec for complete interoperability. | Board will check practically. |

| S. N. | Parameter | Specification | Trial Directives |
|-------------------|---|---|------------------|
| 6 | Digital Audio Signal Processor (Optional):- Qty as per user requirement | | |
| Standard Features | The device should come with 16 Inputs and 16 Outputs. | Board will check practically. | |
| | Should support 22kHz bandwidth stereo AEC on all input channels. | Firm will submit OEM certificate/Datasheet. | |
| | 10-bands of parametric or up to 31-bands graphic EQ. | Firm will submit OEM certificate/Datasheet | |
| | It should provide complete control of devices over built-in Ethernet or RS-232 | Board will check practically. | |
| | Should be compatible with both digital Ceiling Microphone arrays and traditional analog microphones. | Board will check practically. | |
| | Should have an option to cascade multiple DSP to support more audio inputs and outputs. | Board will check practically. | |
| | Optional modular telephony interface cards (single or dual-line PSTN, or VoIP telephony cards) should be available to expand the functionality. | Board will check practically. | |
| | Seamless integration with VC Codec | Board will check practically. | |
| 7 | Wireless Content Sharing Device (Optional):- Qty as per user requirement | | |
| Standard Features | It should be possible to share multiple (up to 4 simultaneously) | Firm will submit OEM certificate. | |
| | Content input/resolution: <ul style="list-style-type: none"> ▪ 1 x HDMI/4K, 30fps ▪ Airplay 1080p, 30fps ▪ Miracast 1080p, 30fps Content output/resolution: <ul style="list-style-type: none"> ▪ 1 x HDMI/4K, 60fps. RGB444 | Board will check practically. | |
| | Should support content interaction and annotation when connected to a touch enabled display. It should provide an option to save the annotated content. | Board will check practically. | |
| | Should have a 3.5mm audio output port | Board will check practically. | |
| | Should have dual network connectivity support: <ul style="list-style-type: none"> ▪ 1X Ethernet 10/100/1000 ▪ 802.11ac Wi-Fi wireless networking; IEEE 802.11a/b/g/n compatible | Board will check practically. | |
| | Should support auto-sensing PoE+ or power through dedicated adapter. | Board will check practically. | |

| S.N. | Specification/Parameter | Trial directive |
|-----------|---|--|
| 8 | 84"/85"/86" 4K LED Display (Optional) :- Nos and size of display as per user requirement | |
| | a) Resolution: 3840x2160 4K Ultra HD | Board will check practically. |
| | b) Contrast Ratio: 1200:1 or higher | Firm will submit OEM certificate. |
| | c) Brightness: 400 cd/m ² or higher | Firm will submit OEM certificate. |
| | d) Viewing Angle (Horizontal/ Vertical): 178° / 178° | Firm will submit OEM certificate. |
| | e) 2 HDMI or more | Board will check practically. |
| | f) Ethernet or RS-232 connectivity | Board will check practically. |
| | g) Certification | Firm will submit UL and FCC certificate. |
| 9 | 65" 4K LED Display (Optional) :- Nos of display as per user requirement | |
| | a. Resolution: 3840x2160 4K Ultra HD | Board will check practically. |
| | b. Contrast Ratio: 1200:1 or higher | Firm will submit OEM certificate. |
| | c. Brightness: 500 cd/m ² or higher | Firm will submit OEM certificate. |
| | d. Viewing Angle (Horizontal/ Vertical): 178° / 178° | Firm will submit OEM certificate. |
| | e. 2 HDMI or more | Board will check practically. |
| | f. Ethernet or RS-232 connectivity | Board will check practically. |
| | g) Certification | Firm will submit UL and FCC certificate. |
| 10 | 55" 4K LED Display (Optional) :- Nos of display as per user requirement | |
| | a. Resolution: 3840x2160 4K Ultra HD | Board will check practically. |
| | b. Contrast Ratio: 1200:1 or higher | Firm will submit OEM certificate. |
| | c. Brightness: 500 cd/m ² or higher | Firm will submit OEM certificate. |
| | d. Viewing Angle (Horizontal/ Vertical): 178° / 178° | Firm will submit OEM certificate. |
| | e. 2 HDMI or more | Board will check practically. |
| | f. Ethernet or RS-232 connectivity | Board will check practically. |
| | g) Certification | Firm will submit UL and FCC certificate. |

| S.N. | Specification/Parameter | | Trial directive |
|-----------|--|---------------------|---|
| 11 | <u>55"/65"/84"/85"/86" LCD/LED touch/interactive anti-glare Display Panel</u> (Optional) :- Nos and size of interactive display as per user requirement | | |
| a. | Resolution: 3840x2160 4K Ultra HD | | Board will check practically. |
| b. | Contrast Ratio: 1200:1 | | Firm will submit OEM certificate. |
| c. | Viewing Angle (Horizontal / Vertical): 178° / 178° | | Firm will submit OEM certificate. |
| d. | 2 HDMI and 1 DP (USB ports as per requirement) with audio connectivity | | Board will check practically. |
| e. | Ethernet or RS 232 connectivity | | Board will check practically. |
| f. | Brightness: 350 cd/m ² or higher | | Firm will submit OEM certificate. |
| g. | Tempered glass with Anti-glare coating | | Board will check practically. |
| h. | Certification | | Firm will submit UL and FCC certificate. |
| i. | Built in touch points: Minimum 10 point touch | | Board will check practically and also firm will submit OEM certificate. |
| 12 | Touch enabled content monitor with annotation for trainees (Optional):- Qty as per user requirement | | |
| a. | Screen Size | 15" or more | BOO will check practically. |
| b. | Resolution | 1920x1080 (full HD) | BOO will check practically and firm will submit OEM certificate. |
| c. | Connectivity | RS-485/RS232 | BOO will check practically. |
| d. | Annotation capability | Available | BOO will check practically. |
| e. | White boarding | Available | BOO will check practically. |
| f. | Input connectivity | VGA/HDMI, USB Port | BOO will check practically. |

| S.N. | Parameter | Specification | Trial directive |
|-----------|---|--|-----------------------------------|
| 13 | Ceiling Document Camera (Optional):- Qty as per user requirement | | |
| a. | Shooting Area | A minimum of 380X285 mm shooting area or better | BOO will check practically. |
| b. | Zoom | It should have a 20X optical zoom or better | BOO will check practically. |
| c. | Focus | It should have Auto/Manual Focus option. | BOO will check practically. |
| d. | Image Sensor | It should have a 1/3" Image Sensor | Firm will submit OEM certificate. |
| e. | Total Pixel | It should have a minimum of 5,000,000 or better | Firm will submit OEM certificate. |
| f. | Resolution | It should have ≥1000TV line or more | Firm will submit OEM certificate. |
| g. | Image Save | SD card or better | BOO will check practically. |
| h. | Signal Support | It should support the following resolutions: 1024×768, 1280×1024, 1280×720, 1920×1080 or more. | Firm will submit OEM certificate. |
| i. | White Balance | It should have option of Auto/Manual White Balance. | BOO will check practically. |
| j. | Multimedia Function | It should have the following Functions: Color/BW, negative, mirror, rotate, text/graphic, brightness control, freeze, preview/shooting, electric volume control, split screen, RGB3×2 matrix | BOO will check practically. |
| k. | RS-232 Input | It should have RS-232 Port for Control or could be optional | BOO will check practically. |
| l. | Control Modes | Following Control Options are required, Control Panel; Remote Controller; RS-232 Control or better | BOO will check practically. |
| m. | Laser mark | Should be available | BOO will check practically. |

| S.N. | Parameter | Specification | Trial directive |
|-----------|--|--|--|
| 14 | Speakers and Power Amplifier (Optional):- Qty as per user requirement | | |
| a | Ceiling Speakers | | |
| | Frequency Range (-10dB) | 80 Hz - 20 kHz | BOO will check practically & also firm will submit data sheet. |
| | Power Capacity | 80 Watts Continuous Program Power 40 Watts Continuous Pink Noise | |
| | Nominal Coverage | 130° Conical Coverage | |
| | Nominal Sensitivity | 86 dB SPL, 1W @ 1 m (3.3ft) | |
| | Maximum SPL @ 1m: | 102dB | |
| | Nominal Impedance | 16 ohms | |
| b | FOH Speakers | | |
| | Frequency Range (-10dB) | 60 Hz - 20 kHz | BOO will check practically & also firm will submit OEM data sheet. |
| | Power Capacity | 200 Watts Continuous Program Power 100 Watts Continuous Pink Noise | |
| | Coverage Angle | 100° x 100° Coverage | |
| | Nominal Sensitivity | 90 dB SPL, 1W @ 1 m (3.3ft) | |
| | Maximum SPL @ 1m | 110 dB | |
| | Nominal Impedance | 8 Ohms | |
| c | Power Amplifier | | |
| a. | Rated Output Power | Min. 100 Watts per channel @ 8Ω | BOO will check practically & also firm will submit OEM data sheet. |
| b. | Number of channels | 2 Channels | |
| c. | Sensitivity | 1.4V | |
| d. | Input Impedance | 20.0 KΩ | |
| e. | Signal-to-Noise Ratio | >97 dB | |
| f. | Total Harmonic Distortion (THD) | < 0.5% | |

| S.N. | Parameter | Specification | Trial directive |
|-----------|---|---|---|
| 15 | PODIUM (Optional):- Qty as per user requirement | | |
| a. | Metallic Smart Podium Should have - | | BOO will check practically & also firm will submit OEM data sheet. |
| b. | Built-in 19" LCD Tablet touch screen Monitor with Viewing angle adjustment | | |
| c. | Integrated PC, with minimum i5 processor, Windows 7 or latest OS | | |
| d. | Keyboard tray | | |
| e. | Cooling Fan | | |
| f. | 19" Rack shelves and drawer | | |
| g. | Built-in Gooseneck Microphone | | |
| h. | Wireless Microphone | | |
| i. | USB Port: Minimum 3 Nos, HDMI port & LAN port. | | |
| 16 | Gooseneck Microphones for local speech re-enforcement of Trainees (Optional):- Qty as per user requirement | | |
| | The Microphone should have a frequency response of 40 Hz to 17,000 Hz or better. | | BOO will check practically & also firm will submit OEM data sheet. |
| | The Microphone should have a Cardioids Polar Pattern. | | |
| | The Microphone should come up with standard 3 PIN XLR Connector. | | |
| | The Cartridge should be a 20mm Condenser | | |
| 17 | Wireless Lapel/ Head worn Microphone (Optional):- Qty as per user requirement | | |
| | The Microphone should have Frequency band of UHF 900 MHz~ or better. | | BOO will check practically & also firm will submit OEM data sheet. |
| | The microphone should have at least Step 8 Digital Variable Squelch Control Method | | |
| | The microphone should have a ± 10 ppm Frequency Stability. | | |
| | The microphone should have Auto Scan Receive Mode. | | |
| | The Microphone should have a frequency response of 40Hz to 17000 Hz or better. | | |
| 18 | Central Infrastructure - Minimum 15 Ports MCU Solution (Optional):- Qty as per user requirement | | |
| i | Hardware | The MCU must be a dedicated hardware-based solution from the same OEM as the endpoint. The MCU should support Redundant Power Supply. | BOO will check practically. |
| ii | Capacity | The solution must support 15 HD1080p30 ports. It must be scalable to support 50 HD1080p30 ports on the same box/server by adding additional licenses only & without the need to add hardware and cascading. | BOO will check practically & also firm will submit OEM certificate. |

| S.N | Parameter | Specification | Trial directive |
|------------|--------------------|--|---|
| | | <p>There must not be any artificial limits imposed in terms of number of conference rooms/concurrent conferences. Keeping future scalability into consideration, the number of concurrent conferences must be equal to at least the port capacity being asked for. Additionally, it should be possible to pre assign 100 meeting rooms dedicated for end users.</p> | <p>BOO will check practically.</p> |
| | | <p>It must be possible to see at least 20 sites simultaneously on the screen. The end points must have the capability to change their local video layout from remote control. The MCU must support 25 layouts.</p> | <p>BOO will check practically.</p> |
| iii | Resolution support | <p>The MCU must support resolutions up to 1080p60.</p> | <p>Firm will submit OEM certificate.</p> |
| iv | Other components | <p>The solution must have native support for H.323 & SIP with the ability of 100 devices registration for H.323 gatekeeper and SIP registrar from day 1. The number of concurrent calls supported must be 15 from day 1 and be scalable to 100 on the same server by through software license. This must be a dedicated, physically separate server to avoid a single point of failure.</p> <p>The solution must include a management, scheduling and provisioning component(s) with capacity of at least 100 devices.</p> <p>This must be a dedicated, physically separate server to avoid a single point of failure.</p> <p>The management system should support provisioning, bandwidth & device management/software upgrade and scheduling of 3rd party video endpoints in addition to the video endpoints of the OEM of the management server.</p> | <p>Firm will submit OEM certificate.</p> <p>BOO will check practically.</p> |

| S.N | Parameter | Specification | Trial directive |
|-----|-------------------------------|--|-----------------------------------|
| | | It must be possible to have an Integrated presence-awareness feature that allows users to verify contact availability and status, and seamless enterprise directory integration which simplifies management and ensures contact list accuracy. | BOO will check practically. |
| | | The solution must include a firewall traversal component for SIP & H.323 video endpoints. It must support at least 15 calls. This must be a dedicate, physically separate server to avoid a single point of failure. Should support firewall traversal solution using the H.460 and SIP protocol. | Firm will submit OEM certificate. |
| | | The solution must include the ability to allow calls from smart phones, tablets and PCs/laptops. | BOO will check practically. |
| v | Protocols | <p>The solution must support H.261, H.263, H.264 AVC, H.264 SVC, H.264 High Profile/H.265</p> <p>The MCU should support content sharing using standard based H.239 and BFCP over H.323 & SIP to up to HD1080 30fps resolution.</p> <p>All components of the solution must support H.323 and SIP from day 1.</p> <p>It should support G.711, G.729A, G.722, G.722.1, AAC-LD or better</p> <p>It should support 20kHz bandwidth with crystal clear audio and stereo sound.</p> <p>The MCU must support Lecture Mode, Presentation Mode & Far End Camera Control.</p> <p>Automatic Gain Control and Automatic Noise Suppression</p> | Firm will submit OEM certificate. |
| vi | Security | The solution must support encryption on H.323, SIP and H.320. | Firm will submit OEM certificate. |
| vii | Interoperability | <p>The solution must be interoperable with standards-based end points, even if they are from a different OEM for all the video ports. Any hardware required to interoperability should be supplied from day one.</p> <p>The solution must support both dial-in and dial-out of calls.</p> | BOO will check practically. |
| 19 | Cables and Connectors: | Input/output panels for video, audio & network cabling like HDMI/VGA/PC Audio/Speaker/Control/Microphone/Ethernet/USB etc. | BOO will check practically. |

| S.N | Parameter | Specification | Trial directive |
|------------|--|---|------------------------|
| 20 | Lighting system | for virtual class room. (Optional):- as per requirement | |
| 21 | Switching & Distribution System: | Required Switching & Distribution System for establishing the virtual class room. | |
| 22 | Room Interiors (Carpeting, Wall Panelling, Acoustic Ceiling) (Optional):- as per requirement | | |
| 23 | Furniture: Chairs & Tables (Optional):- as per requirement | | |
| 24 | Online UPS 5/7.5/10 or higher capacity (Optional):- Nos and capacity of UPS as per user requirement | | |
| 25 | Air Conditioning: AC Type, Capacity & Quantity decided by user (Optional) | | |

Optional features may be incorporated by the user agency

| S. N | Detailed Description | Technical Requirement (Virtual Classroom Set Up) |
|-------------|---|---|
| 1 | Room Design & Furniture Real Estate Setup | <ul style="list-style-type: none"> • The training room should be designed in a manner that the trainer is centrally positioned to all the trainees/attendees present locally in the suite and everybody sits directly facing the trainer. • The trainer should be able to see all the trainees present locally all the time. • The trainer lectern should be placed in a manner that it is not acting as an obstruction for the trainees available locally and they are able to see trainer always in the most effective manner from anywhere in the room. • The lectern should be designed in a manner that it is providing an effective front drop to give the appearance of the distant trainer as if he/she is present locally behind the lectern. • The lectern should have in-built equipment rack with silent fans for cooling mechanism. • The trainee tables should be designed in a manner so that all the trainees seated should always be visible to the trainer from the lectern. • The same special design on the table should also house the gooseneck microphones along with the speakers, the way on table content monitors are installed. • The trainee table should house all the above mentioned items however still no obstruction between the trainer and the trainees. • The trainees table should be designed in a manner so that no liquid spillage should damage any equipment in the setup. • The design of the table(s) in Training Room should be such that no wires or cables are visible neither on the table nor at the legs of the tables. • Bidder to provide complete Virtual Classroom interiors design including design of the tables, walls as well as the ceiling design. • The Virtual Classroom design should be such that it is optimized for local trainings, Distance Ultra Immersive Video training and Distance |

| | | |
|---|--|--|
| | | <p>Ultra Immersive Video learning without compromising the quality of training and interaction in any ways.</p> <ul style="list-style-type: none"> • Erection and fabrication of the rooms - Only bare shell space would be provided with raw power. Bidder to erect entire partitions, interiors including joinery, all furniture, carpeting, false ceilings, |
| 2 | <p><u>Local Training/Local seminar/Local conference Room Experience</u></p> | <ul style="list-style-type: none"> • The trainer should be able to select the local training mode with all the local training required back-end equipment. • The trainer should be able to share content over laptop and document during local meeting/local training. • The trainer should be able to annotate/highlight on the content monitor provided to him on his lectern. • The annotated/highlighted screen work out should be visible to all the trainees on their table content monitors and are also visible on the front interactive displays. • The annotation/highlighting on the content monitor should not be asking the user to upload software or to connect a laptop with USB connections neither any special pen/stylus should be required and just by using finger all capabilities should be achieved. • The trainees also should be empowered to annotate and highlight on the content monitor, which is provided to him/her on the table, in order to ask any question and to clear any doubt. • The trainer should be able to open a whiteboard/blackboard on the content monitor. • The shared work on the table whiteboard of the trainer should be visible to all the trainees' table content monitors as well as the front interactive displays. • The content monitors should be adjustable to go back by 150 degrees so that they don't act as an obstruction on the table/on the trainer lectern. • The trainees should be able to write on the same white board which the trainer wrote on/used without physically going to the whiteboard. |

| | | |
|---|---|---|
| | | <ul style="list-style-type: none"> • The annotated/highlighted content on the whiteboard should get saved with a simple touch on the content monitor. • The whiteboard on the table should be extendable to multiple screens so that the user can work on them and with one touch, all the different whiteboard screen extensions shrink to become one whiteboard. <p>The trainer apart from annotation on the content monitor should also be able to annotate/highlight on the front interactive displays all by double tapping on the screens without using any pen, just by using the fingers</p> |
| 3 | <p>Audio Experience During Local Training / Seminars / Conferences & During Video Collaborative Sessions</p> | <ul style="list-style-type: none"> • The room should have front of the house speakers for the spatial presentation audio which will be audible across all the corners of the room. • The trainees should be provided with most effective on table local speech reinforcement solution so that everyone is able to hear each other very clearly during the local training. • For local speech reinforcement, the trainees should be provided with on table gooseneck microphones along with the speakers for the same. • The audio of the trainer should be uniformly spatial for the same location across all the trainees. • All the trainees should be heard crystal clear by the local trainees irrespective of place they are sitting in the room. • During Video training the trainer voice should be easily send across the other sites without shouting. • The near site trainees and far site trainees during this session should feel as if they are in the same room. <p>The far site audio of the video participants should come from the front speakers in a manner as they are present there.</p> |