GOVERNMENT OF INDIA
(Ministry of Home Affairs)
DIRECTORATE GENERAL
CENTRAL RESERVE POLICE FORCE
EAST BLOCK-7, SEC-1, R.K. PURAM, NEW DELHI-110066
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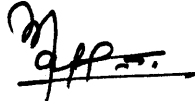No. B.V-7/2019-20-C (VCR)   Dated, the 20ᵗʰ May'2019

To

1. DIG (Comn), ITBP
   Block No. 2, CGO Complex
   Lodhi Road, New Delhi-03

2. DIG (Comn), NSG
   Meharam Nagar
   Palam, New Delhi-37

3. DIG (Comn), SSB
   East Block-V, R.K Puram
   New- Delhi-66

4. AIG (Comn), CISF
   Block No. 13, CGO, Complex
   Lodhi Road, New Delhi-03

5. DIG (Prov), BSF
   Block No. 10, CGO Complex
   Lodhi Road, New Delhi-03

6. Liaison Office, Assam Rifle
   Room No-171, North Block, MHA
   New Delhi -01

Subject: Regarding QRs/TDs of Virtual Class Room.

Please find enclosed QRs and TDs of Virtual Class Room as Annexure-A & Annexure-B respectively duly approved by the competent authority for is forwarded herewith further necessary action.

Encl: (QRs & TDs of Virtual Class Room)

{P.R.Jha, DC (Comn)}
For DIG (Equipment)
Directorate General, CRPF

QRs of Virtual Class Room

S. N.	Parameter	Specification
	General:-	
1		Virtual Class room should have the below mentioned features and functionalities:
a		Ultra-Immersive Learning and Training Virtual Classroom with video stream having Nos of seats Training/Learning Room/Seminar Hall (as per user requirement).
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.
2	**VIDEO CONFERNCING 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 1080p@60fps, 1080p@30 fps, 720p@60fps, 720p@30fps & FCIF.
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 simultaneously to the far end location at 1080p 60fps
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

S. N.	Parameter	Specification
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 (Optional As per user requirement)
		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 or USB 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
k	Other Standards/features	H224/H.281, H.323 Annex Q, H.225, H.245, H.241, H.239, H.243, H.460
3	**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.	

S. N.	Parameter	Specification
4	**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.
		Option-I:- It should be possible to connect such two systems via Cascading Mode to ensure every part of the meeting room participants can be focused on to find the appropriate active speaker. **OR** **Option-II:-** Speaker tracking camera for trainees/trainer should be provided with the camera focusing wired/wireless audio system or camera focusing look at me buttons. For tracking the trainer system should enable the far site to view the trainer whenever moves from whiteboard to another or from podium to whiteboard without even making any noise or sound. (As per user requirement)
		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.
5	**Tabletop Microphone (Optional):- Qty as per user requirement**	
	Standard Features	It should offer consistent, reliable, 360°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.

S.N.	Parameter	Specification
6	**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 room.
		It should offer consistent, reliable, 360° voice pickup.
		It should be a digital microphone with three or more cardioid elements or better per microphone.
		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
7	**Digital Audio Signal Processor (Optional):- Qty as per user requirement**	
	Standard Features	The device should come with 16 Inputs and 16 Outputs.
		Should support 20KHz 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
8	**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: • 1 x HDMI/4K@30fps • Airplay 1080p@30fps • Miracast 1080p@30fps Content output/resolution: • 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

S. N.	Parameter	Specification
		Should have dual network connectivity support: • 1 x 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.
9	**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: 350 cd/m² or higher	
	d) Viewing Angle (Horizontal/ Vertical): 178° / 178°	
	e) 2 HDMI or more	
	f) Ethernet/RJ 45-1 and RS 232	
	g) Certification of UL and FCC	
10	**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: 350 cd /m² or higher	
	d. Viewing Angle (Horizontal/ Vertical): 178° / 178°	
	e. 2 HDMI or more	
	f. Ethernet/RJ 45-1 and RS 232	
	g. Certification of UL and FCC	
11	**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: 350 cd /m² or higher	
	d. Viewing Angle (Horizontal/ Vertical): 178° / 178°	
	e. 2 HDMI or more	
	f. Ethernet/RJ 45-1 and RS 232	
	g. Certification of UL and FCC	
12	**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 or more HDMI and 1 DP (USB ports as per requirement) with audio connectivity	

S.N.	Specification/Parameter	
e.	Ethernet/RJ 45-1 and RS 232	
f.	Brightness: 350 cd/m² or higher	
g.	Tempered glass with Anti-glare coating	
h.	Certification of UL and FCC	
i.	Built in touch points: Minimum 10 point touch	
13	**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/RS-232
d.	Annotation capability	Available
e.	White boarding	Available
f.	Input connectivity	VGA/HDMI, USB Port
14	**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
l.	Control Modes	Following Control Options are required: • Control Panel • Remote Controller • RS-232 Control or better
m.	Laser mark	Should be available
15	**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

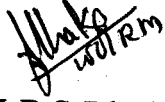| S.N.	Parameter	Specification
b	**FOH Speakers**	
	Frequency Range (-10dB)	60 Hz - 20 KHz
	Power Capacity	200 Watts Continuous Program Power100 Watts Continuous Pink Noise
	Coverage Angle	100° x 100° Coverage
	Nominal Sensitivity	90 dB SPL, 1W @ 1m (3.3ft)
	Maximum SPL @ 1m	110 dB
	Nominal Impedance	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%
16	**PODIUM (Optional):-** User can specify as per their requirement	
17	**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	
18	**Wireless Lapel/ Head worn Microphone (Optional):- Qty as per user requirement**	
	The Microphone should have Frequency band of UHF 900 MHz.	
	The microphone should have at least Step 8 Digital Variable Squelch Control Method	
	The microphone should have a ±10ppm Frequency Stability.	
	The microphone should have Auto Scan Receive Mode.	
	The Microphone should have a frequency response of 40Hz to 17000 Hz or better.	
19	**Central Infrastructure – Minimum15 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.

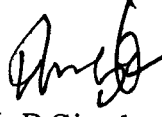| S.N.	Parameter	Specification
		There must not be any artificial limits imposed in terms of number of conference rooms/concurrent conferences. Keeping future scalability into consideration, the number of concurrent conferences must be equal to at least the port capacity being asked for. Additionally, it should be possible to pre assign 100 meeting rooms dedicated for end users.
		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.
iii	Resolution support	The MCU must support resolutions up to 1080p@60fps.
iv	Other components	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 one. The number of concurrent calls supported must be 15 from day one 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.
		The solution must include a management, scheduling and provisioning component(s) with capacity of at least 100 devices. This must be a dedicated, physically separate server to avoid a single point of failure. 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.
		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	The solution must support H.261, H.263, H.264 AVC, H.264 SVC, H.264 High Profile/H.265

S.N	Parameter	Specification
		The MCU should support content sharing using standard based H.239 and BFCP over H.323 & SIP to up to HD1080@30fps resolution.
		All components of the solution must support H.323 and SIP from day one.
		It should support G.711, G.729A, G.722, G.722.1, AAC-LD or better
		It should support 20KHz bandwidth with crystal clear audio and stereo sound.
		The MCU must support Lecture Mode, Presentation Mode & Far End Camera Control.
		Automatic Gain Control and Automatic Noise Suppression
vi	Security	The solution must support encryption on H.323, SIP and H.320.
vii	Interoperability	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.
		The solution must support both dial-in and dial-out of calls.
20	**Cables and Connectors:** Input / output panels for video, audio & network cabling like HDMI/ VGA/ PC Audio/ Speaker/ Control/Microphone/ Ethernet/USB etc.	
21	**Lighting system** for virtual class room. **(Optional):- As per user requirement**	
22	**Switching & Distribution System:** Required Switching & Distribution System for establishing the virtual class room.	
23	**Room Interiors** (Carpeting, Wall Panelling, Acoustic Ceiling) **(Optional):- As per user requirement**	
24	**Furniture:** Chairs & Tables **(Optional: Qty as per user requirement)**	
25	**Online UPS** 5/7.5/10 KVA or higher capacity **(Optional):- Nos and capacity of UPS as per user requirement**	

S.N	Parameter/ Specification
26	**Air Conditioning:** AC Type, Capacity & Quantity decided by user **(Optional)**
27	Room Design & Furniture Real Estate Setup: User can specify as per their requirement **(Optional)**

WO/RM R.S.Dhaka
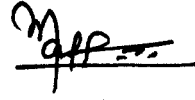Assam Rifles

INSP. L.P.Singh
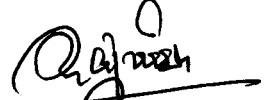BSF

AC.I Rajendra Singh
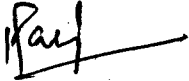NSG

INSP. Chittar Mal
SSB

Mahesh Kumar Gaur, AC
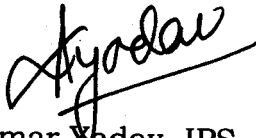ITBP

S.S. Sikarwar, DC
CISF

P.R.Jha,DC(Comn)
CRPF

Rajnish Kumar,PSO(E)
BPR&D
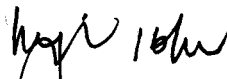
Harjinder Singh, DIG(Eqpt)
CRPF

D.S.Rawat, DIG(Comn)
CRPF

Ajay Kumar Yadav, IPS, IGP(Comn &IT)
CRPF

Md. Javed Akthar, IPS, ADG (Comn)
CRPF

Approved/Not Approved

Rajeev Rai Bhatnagar, IPS
DG, CRPF

TDs of Virtual Class Room

S. N.	Parameter	Specification	Trial Directives
1	**General:-** Virtual Class room should have the below mentioned features and functionalities:		
a		Ultra-Immersive Learning and Training Virtual Classroom with video stream having Nos of seats Training/Learning Room/Seminar Hall (as per user requirement).	
b		Number of sites connectivity as required by user for Virtual class room.	Board will check practically for sl no (a) to (d), (f) to (h) and firm will submit OEM certificate for sl no (e).
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.	
2	**VIDEO CONFERNCING 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.	Board will check practically and firm will submit OEM certificate for protocols.
		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 1080p@60fps, 1080p@30fps, 720p@60fps, 720p@30fps & FCIF.	
c	Content Standards and Resolutions	It should support content sharing using standard based H.239 & BFCP.	Board will check practically and firm will submit OEM certificate for protocols.
		It should also support audio from PC used for content sharing.	
		It should transmit both people and content simultaneously to the far end location at 1080p 60fps	

S. N.	Parameter	Specification	Trial Directives
d	Audio Standards and Features	It should support G.711, G.728, G.729A, G.722, G.722.1, AAC-LD or better	Board will check practically and firm will submit OEM certificate for protocols.
		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	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 (Optional As per user requirement)	
		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.	Board will check practically
		1 x HDMI or USB 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	Board will check practically
		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	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.
3	**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.
4	**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.
		Option-I:- It should be possible to connect such two systems via Cascading Mode to ensure every part of the meeting room participants can be focused on to find the appropriate active speaker. **OR** **Option-II:-** Speaker tracking camera for trainees/trainer should be provided with the camera focusing wired/wireless audio system or camera focusing look at me buttons. For tracking the trainer system should enable the far site to view the trainer whenever moves from whiteboard to another or from podium to whiteboard without even making any noise or sound. (As per user requirement)	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.

S.N.	Parameter	Specification	Trial Directive
		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
5	Tabletop Microphone (Optional):- Qty as per user requirement		
	Standard Features	It should offer consistent, reliable, 360° 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
6	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 room.	Board will check practically.
		It should offer consistent, reliable, 360° voice pickup.	Board will check practically.
		It should be a digital microphone with three or more cardioid elements or better per microphone.	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.

S. N.	Parameter	Specification	Trial Directives
7	**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 20KHz 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.
8	**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: • 1 x HDMI/4K, 30fps • Airplay 1080p@30fps • Miracast 1080p@30fps Content output/resolution: • 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: • 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
9	**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: 350 cd/m² 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/RJ 45-1 and RS 232	Board will check practically.
	g) Certification of UL and FCC	Firm will submit UL and FCC certificate.
10	**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: 350 cd/m² 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/RJ 45-1 and RS 232	Board will check practically.
	g. Certification of UL and FCC	Firm will submit UL and FCC certificate.
11	**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: 350 cd/m² 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/RJ 45-1 and RS 232	Board will check practically.
	g. Certification of UL and FCC	Firm will submit UL and FCC certificate.

S.N.	Specification/Parameter		Trial directive
12	**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		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 or more HDMI and 1 DP (USB ports as per requirement) with audio connectivity		Board will check practically.
e.	Ethernet/RJ 45-1 and RS 232		Board will check practically.
f.	Brightness: 350 cd/m² or higher		Firm will submit OEM certificate.
g.	Tempered glass with Anti-glare coating		Board will check practically.
h.	Certification of UL and FCC		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.
13	**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/RS-232	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
14	**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	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
15	**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
16	PODIUM(Optional):- User can specify as per their requirement			BOO will check practically & firm will also submit OEM data sheet
17	**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 & firm will also 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	
18	**Wireless Lapel/ Head worn Microphone (Optional):- Qty as per user requirement**			
			The Microphone should have Frequency band of UHF 900 MHz.	BOO will check practically & firm will also submit OEM data sheet.
			The microphone should have at least Step 8 Digital Variable Squelch Control Method	
			The microphone should have a ±10ppm Frequency Stability.	
			The microphone should have Auto Scan Receive Mode.	
			The Microphone should have a frequency response of 40Hz to 17000 Hz or better.	
19	**Central Infrastructure – Minimum15 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.	BOO will check practically.
			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.	BOO will check practically & firm will also submit OEM certificate.
			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.	BOO will check practically.

S.N	Parameter	Specification	Trial directive
		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.	BOO will check practically.
iii	Resolution support	The MCU must support resolutions up to 1080p@60fps.	Firm will submit OEM certificate.
iv	Other components	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 one. The number of concurrent calls supported must be 15 from day one 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.	Firm will submit OEM certificate.
		The solution must include a management, scheduling and provisioning component(s) with capacity of at least 100 devices. This must be a dedicated, physically separate server to avoid a single point of failure. 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.	BOO will check practically.
		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.

S.N	Parameter	Specification	Trial directive
		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	The solution must support H.261, H.263, H.264 AVC, H.264 SVC, H.264 High Profile/H.265	Firm will submit OEM certificate.
		The MCU should support content sharing using standard based H.239 and BFCP over H.323 & SIP to up to HD1080@30fps resolution.	
		All components of the solution must support H.323 and SIP from day one.	
		It should support G.711, G.729A, G.722, G.722.1, AAC-LD or better	
		It should support 20KHz bandwidth with crystal clear audio and stereo sound.	
		The MCU must support Lecture Mode, Presentation Mode & Far End Camera Control.	
		Automatic Gain Control and Automatic Noise Suppression	
vi	Security	The solution must support encryption on H.323, SIP and H.320.	Firm will submit OEM certificate.
vii	Interoperability	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.	BOO will check practically.
		The solution must support both dial-in and dial-out of calls.	
20	**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.
21	**Lighting system** for virtual class room. **(Optional):- As per user requirement**		
22	**Switching & Distribution System:** Required Switching & Distribution System for establishing the virtual class room.		

S.N	Parameter	Specification	Trial directive
23	**Room Interiors** (Carpeting, Wall Panelling, Acoustic Ceiling) **(Optional):- As per user requirement**		
24	**Furniture:** Chairs & Tables **(Optional):- As per user requirement**		
25	**Online UPS 5/7.5/10 or higher capacity (Optional):- Nos and capacity of UPS as per user requirement**		
26	**Air Conditioning:** AC Type, Capacity & Quantity decided by user **(Optional)**		
27	Room Design & Furniture Real Estate Setup: User can specify as per their requirement **(Optional)**		

WO/RM R.S.Dhaka
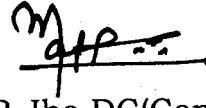Assam Rifles

INSP. L.P.Singh
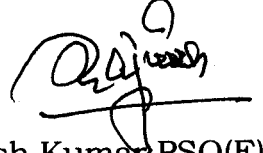BSF

AC.I Rajendra Singh
NSG

INSP. Chittar Mal
SSB

Mahesh Kumar Gaur, AC
ITBP

S.S. Sikarwar, DC
CISF

P.R.Jha,DC(Comn)
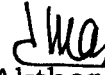CRPF

Rajnish Kumar,PSO(E)
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