

	IIT Madras Chennai 600 036 PURCHASE SECTION Email: tender@imail.iitm.ac.in Telephone:(044) 2257 9763 GSTIN: 33AAAAI3615G1Z6	
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The Manager (Project Purchase)

Date: 25/04/2023

Open Tender Reference No: CE/RAVI/103/2023/SMARTCLASSAV

GEM NAR ID: GEM/GARPTS/21042023/NGW2HXMEN9QQ

Due Date/Time: **15.05.2023@ 3:00 PM**

Dear Sir,

On behalf of the IIT Madras, Tenders are invited in two bid system from **Class-I local suppliers and Class II local suppliers**, namely technical and financial bids for

“SUPPLY, INSTALLATION AND COMMISSIONING OF AUDIO AND VIDEO CONFERENCE SYSTEM FOR SMART CLASSROOM of IIT MADRAS AS PER DESIGN

conforming to the specifications enclosed in **Annexure ‘1’**

Tender Documents may be downloaded from Central Public Procurement Portal <https://etenders.gov.in/eprocure/app>. Aspiring Bidders who have not enrolled / registered in e-procurement should enroll / register before participating through the website <https://etenders.gov.in/eprocure/app>. The portal enrolment is free of cost. Bidders are advised to go through instructions provided at **“Help for contractors”**. [Special Instructions to the Contractors/Bidders for the e-submission of the bids online through this eProcurement Portal”].

Bidders can access tender documents on the website (For searching in the NIC site, kindly go to Tender Search option and type ‘IIT’. Thereafter, click on “GO” button to view all IIT Madras tenders). Select the appropriate tender and fill them with all relevant information and submit the completed tender document online on the website <https://etenders.gov.in/eprocure/app> as per the schedule attached.

No manual bids will be accepted. All tender documents including pre-qualification, Technical and Financial bids should be submitted in the E-procurement portal.

Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be placed in the technical part of the bid, wherever applicable. Samples if called for, should be submitted free of charges, and collected back at the supplier’s expenses.

1	LAST DATE for receipt of Tender	:	15.05.2023@ 3:00 PM
	PRE-BID Meeting	:	01.05.2023 @ 2 PM, IC & SR, IIT Madras Before joining this meeting, bidders should send email with details of person who will attend this meeting and their company details along with your queries to cmit-icsr@iitm.ac.in on or before 29.04.2023 @ 05:00 PM
	Date & Time of opening of Tender	:	16.05.2023 @ 3:00 PM
GUIDELINES, TERMS AND CONDITIONS OF TENDER			

A	Submission of Tender	<p>: As per the directives of Department of Expenditure, this tender document has been published on the Central Public Procurement Portal URL: https://etenders.gov.in/eprocure/app</p> <p>The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal</p> <p>More information useful for submitting online bids on the CPP Portal may be obtained at: https://etenders.gov.in/eprocure/app</p> <p>All tender documents including Technical Bid & Financial Bid should be submitted separately in online CPP portal as per the specified format only. Right is reserved to ignore any tender which fails to comply with the above instructions. No manual bid submission will be entertained.</p>
B	Instructions for online bid submission	<p>: REGISTRATION</p> <ul style="list-style-type: none"> • Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal URL: https://etenders.gov.in/eprocure/app by clicking on “Online Bidder Enrollment”. Enrolment on the CPP Portal is free of charge. • As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts. • Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal. • Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.) https://eprocure.gov.in/eprocure/app with their profile. • Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse. <p>Bidder then may log in to the site through the secured log-in by entering their user ID / password and the password of the DSC / eToken.</p>
C	Searching for tender documents	<p>: </p> <ul style="list-style-type: none"> • There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as organization name, form of contract, location, date, other keywords etc. to search for a tender published on the CPP Portal. • Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective “My Tender” folder. This would enable the CPP Portal to intimate the bidders through SMS / email in case there is any corrigendum issued to the tender document. • The bidder should make a note of the unique Tender ID assigned to each tender; in case they want to obtain any clarification / help from the Helpdesk.

D	Preparation of bids	<p>:</p> <ul style="list-style-type: none"> • Bidder should take into account any corrigendum published on the tender document before submitting their bids. • Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid. • Bidder, in advance, should prepare the bid documents to be submitted as indicated in the tender document / schedule and generally shall be in PDF / XLS formats as the case may be. Bid documents may be scanned with 100 dpi with black and white option. • To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, GSTIN Details, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use “My Documents” area available to them to upload such documents. These documents may be directly submitted from the “My Documents” area while submitting a bid and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.
E	Submission of bids	<p>:</p> <ul style="list-style-type: none"> • Bidder should log into the site well in advance for bid submission so that he/she can upload the bid in time i.e. on or before the bid submission date and time. Bidder will be responsible for any delay due to other issues. • The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document. • Bid Security Declaration has to be submitted in the Technical Bid as per prescribed format given in Annexure-8. Otherwise, the tender will be summarily rejected. • A standard BOQ format has been provided in Annexure-5 with the tender document to be filled by all the bidders. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. Bidders are required to download the BOQ file, open it and complete the detail with their respective financial quotes and other details (such as name of the bidder). If the BOQ file is found to be modified by the bidder, the bid will be rejected. • The server time (which is displayed on the bidders’ dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission. • The Tender Inviting Authority (TIA) will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders due to local issues. • The uploaded tender documents become readable only after the tender opening by the authorized bid openers. • Upon the successful and timely submission of bids, the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details. • Kindly add scanned PDF of all relevant documents in a single PDF file of compliance sheet.

F	Assistance to bidders	: <ul style="list-style-type: none"> Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender. Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk. The contact number for the helpdesk is [0120-4200462, 0120-4001002, 0120-4001005]
G	General Instructions to the Bidders	: <ul style="list-style-type: none"> The tenders will be received online through portal https://etenders.gov.in/eprocure/app. In the Technical Bids, the bidders are required to upload all the documents in pdf format. Possession of a Valid Class II/III Digital Signature Certificate (DSC) in the form of smart card/e-token in the company's name is a prerequisite for registration and participating in the bid submission activities through https://etenders.gov.in/eprocure/app Digital Signature Certificates can be obtained from the authorized certifying agencies, details of which are available in the web site https://etenders.gov.in/eprocure/app under the "Information about DSC".
H	Bid Security Declaration & Performance Guarantee	: <p>As per OM No.F.9/4/2020 – PPD dated 12.11.2020. In lieu of EMD, the bidder may submit "Bid Security Declaration in the proforma given in <u>Annexure – 8.</u></p> <p>The successful bidder shall submit a Performance Guarantee of 3% of the purchase order value by way of DD/ Bank Guarantee obtained from any commercial bank, which would be released on expiry/termination of the contract after adjustment of dues, if any. The security deposit should be valid for two months beyond the duration of the contract.</p>
2	Marking on Technical Bid	: <ol style="list-style-type: none"> The vendor eligibility criteria, scope of work and technical Specification along with bill of materials details for this tender is given in <u>Annexure 1 to 3.</u> The tenderer shall go through the Annexures and submit the technical bid. The Floor plan of Board room is given in <u>Annexure -2</u> The AV Line Diagram is given in <u>Annexure -3.</u> The Technical bid should be submitted in the proforma given as per <u>Annexure -4</u> All technical bids should have the page-wise heading as "Technical Bid" and page no. in all pages with seal and signature of authorized signatory. The total no. of pages should be mentioned at the last page of the documents. <p>The technical bid should consist of all technical details along with catalogue/brochure, model number and other technical, commercial terms and conditions. The technical bid should contain only technical details called for in the prescribed proforma along with the supporting documents. No other details apart from the technical details should be submitted in the technical bid. If any deviation in this regard is found in the technical bid submitted, the tender will be summarily rejected.</p>

3	Marking on Financial Bid	: i. Financial bid should be submitted in the prescribed proforma format as per Annexure-5 in xls format (BOQ) through e-tender only. No manual or other form of submission of Financial Bid will not be entertained. ii. Financial bid should indicate item-wise price <u>for all the items</u> mentioned in the technical bid. iii. Total value in the financial bid should be indicated in figures & words clearly.
4	<p>EMD: The EMD of Rs.3,00,000 to be transferred to the account details mentioned in Annexure 8 and proof should be enclosed in the Technical Bid. Any offer not accompanied with the EMD shall be rejected summarily as non-responsive.</p> <p>The EMD of the unsuccessful bidders shall be returned within 30 days of the end of the bid validity period. The same shall be forfeited, if the tenderers withdraw their offer after the opening during the bid validity period. The Institute shall not be liable for payment of any interest on EMD.</p> <p>EMD is exempted for Micro and Small Enterprises (MSE) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) and Startups as recognized by Department of Industrial Policy & Promotion (DIPP). (MSE/MSME/DIPP PROOF should be enclosed in the cover containing technical bid).</p>	
5	<p>Performance Security: -</p> <p>The successful bidder should submit Performance Security for an amount of 3% of the value of the contract/supply. The Performance Security may be furnished in the form of an Account Payee DD, FD Receipt in the name of “The Registrar, IIT Madras” from any scheduled commercial bank or Bank Guarantee from any scheduled commercial bank in India. The performance security should be furnished within 14 days from the date of the purchase order.</p> <p>Performance Security in the form of Bank Guarantee: - In case the successful bidder wishes to submit Performance Security in the form of Bank Guarantee, the Bank Guarantee should be routed directly to IIT Madras from the Bank.</p> <p>The Bank Guarantee should remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including the warranty obligations.</p>	
6	<p>Preparation of Tender:</p> <p>Bid I Technical Bid</p> <p>The technical bid should consist of Pre-Qualification Criteria (Bidder Eligibility Criteria - I & II) and technical specification compliance sheet as per Annexure 4.</p> <p>Bid II Financial Bid</p> <p>The financial bid should be submitted in excel format (BoQ) as per the proforma (Annexure 5) uploaded in the e-Tender web site. The Quoted price should be for supply and installation of the item and inclusive of all cost and statutory levies at IIT Madras..</p>	
7	<p>Prices:</p> <p>i. The prices quoted must be Nett considering all scope of work, terms & conditions and as per the technical specification mentioned in Annexures 1 -3. The prices quoted by the bidders should be inclusive of GST and other statutory levies.</p> <p>ii. The percentage of tax etc. included in the price should be indicated in clear terms. If the inclusive price is not given, we will treat your offered rate as inclusive rate and comparison be made with others. If at the time of comparison of your offer without taxes etc. is happen to be lowest, you are bound to supply as per the offered rate, i.e. without taxes etc.</p> <p>iii. Prices should be quoted in INR only.</p> <p>All conditional tenders will be summarily rejected.</p>	

8	<p>Signing of Tender:</p> <p>The Tender is liable to be rejected if complete information is not given therein or if the particulars and date (if any) asked for in the schedule to the Tender are not fully filled in or not duly signed/authenticated. Specific attention is drawn to the delivery dates and terms and conditions enclosed herewith. Each page of the technical bid required to be signed and bears the official seal of the tenderers.</p> <p>If the application is made by a firm in partnership, it shall be signed (with seal) by all the partners of the firm above their full typewritten names and current addresses or alternatively by a partner holding power of attorney for the firm in which case a certified copy of the power of attorney shall accompany the application. A certified copy of the partnership deed along with current addresses of all the partners of the firm shall also accompany the application.</p> <p>If a limited company or a corporation makes the application, it shall be signed by a duly authorized person holding power of attorney for signing the application, in which case a certified copy of the power of attorney shall accompany the application. Such limited company or corporation may be required to furnish satisfactory evidence of its existence. The applicant shall also furnish a copy of the Memorandum of Articles of association duly attested by a Public notary.</p>
9	<p>Period for which the offer will remain open:</p> <p>The Tender shall remain open for acceptance/validity till: 120 days from the date of opening of the tender. However, the day up to which the offer is to remain open being declared closed holiday for the Indian Institute of Technology Madras, the offer shall remain open for acceptance till the next working day.</p>
10	<p>For the same tender, either the OEM or the authorized dealer/service provider can only quote. But both of them cannot quote separately for the same tender.</p>

11	<p>Public Procurement – Preference to Make in India:</p> <p>This tender will be evaluated based on Public Procurement (Preference to Make in India) DIPP, MoCI Order No. 45021/2/2017-PP (BE II) dated 16th September 2020 and other subsequent orders issued therein. Accordingly, preference will be given to the Make in India products while evaluating the bids, however, it is the sole responsibility of the bidder(s) to specify the product quoted by them is of Make in India product along with respective documentary evidence as stipulated in the aforesaid order in the technical bid itself. Necessary self-certification about the classification of the supplier/bidder as per the above order should be submitted by the bidder in Annexure-6A and 6B. Non-submission of self-certification will lead to rejection of bid out rightly and the bidder will be treated as non-local supplier. The bidder offering imported products will fall under the category of Non-local suppliers. They can't claim themselves as Class-I Local Suppliers/Class-II Local Suppliers by claiming services such as transportation, insurance, installation, commissioning, training and after sales service support like AMC/CAMC etc. as local value addition.</p>
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12 PRE-QUALIFICATION CRITERIA

Bidder Eligibility Criteria I:

1. Only 'Class-I local suppliers' and 'Class-II local suppliers', as defined under DIPP, MoCI Order No. P-45021/2/2017-PP (BE II) dated 16th September 2020 and other subsequent orders issued therein, shall be eligible to bid in this tender. Declaration for Class-I and Class-II local suppliers should be submitted in the prescribed proforma format as per **Annexure-6**
2. Bidder should confirm their acceptance that they comply with the provisions with report to "Guidelines for eligibility of a bidder from a country which shares a land border with India as detailed at **Annexure-7**. The bidder should submit Certificate for "Bidder from/ Not from Country sharing Land border with India & Registration of Bidder with Competent Authority" as per Order of DoE F.No.6/18/2019-PPD dated 23.07.2020 as mentioned.

Bidder Eligibility Criteria II:

1. The firm should not have been blacklisted / debarred by any Government/ regulatory bodies in India. A self-declaration format given in **Annexure – 9**
2. The bidder should submit OEM authorization for the mentioned items Sr# 1 to 4, 6 to 18, 20 and 24 to 27 Make/brand of item for which they are submitting the bid (format is given in **Annexure-10**).
3. The bidder should have similar experience in the last 3 years (2020, 2021 and 2022) in Govt. Institutions/any of Central PSU's / any of central Government/ autonomous bodies/reputed firms in executing the following works (any one category).
 - i) Two (2) similar contracts each costing not less Rs. 50 Lakhs

(Or)

 - ii) One (1) similar contract costing not less than Rs. 1 Crore

Copies of the documents listed below should be submitted as a proof for the above work experience:

- i) Purchase Order
 - ii) Work Completion Certificates
 - iii) User Performance Certificate from End User
4. The bidder shall have an annual financial turnover of not less than Rs. 2 Crores (Rupees Two Crores only) during any two of the last three financial years i.e. 2020-21, 2021-22 and 2022-23. (**Financial statements / certificates issued by Chartered Accountant should be submitted as proof**).

13	<p>Terms of Delivery: Supplier will be fully responsible for the safe carriage, Installation/Commissioning of goods up to the IC&SR, IIT Madras or named place as per PO, Insurance coverage will be in the scope of the supplier. The tenderer should indicate clearly the time required for delivery of the item (subject to the approval of the Executive Committee-IIT-Madras). In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied. In the event of delay or non-supply of materials/execution of Contract beyond the date of delivery/completion of job. The penalty will be levied @1% per week of delay subject to a max of 10% of the value of purchase order and if the delay is more than accepted time frame by IIT M, the PO would be partially or fully cancelled and liquidated damages will be enforced accordingly.</p>
14	<p>Evaluation of Bids:</p> <p>Bid evaluation will take place in two stages.</p> <p>Stage I: Technical Bid evaluation</p> <ol style="list-style-type: none"> 1. Bidder Eligibility Criteria-I will be evaluated first and those bidders who have complied with this criteria alone be evaluated for the Bidder Eligibility Criteria-II and technical Specification evaluation. 2. In the 2nd stage, the Bidder Eligibility Criteria-II and the technical specification offered by the bidders will be evaluated by the technical committee for compliance. The proposed technical specification offered by the bidder should be equivalent or higher to the specifications mentioned in the technical bid. 3. All bidders who have fully complied with Bidder Eligibility Criteria I, II and technical evaluation will only be considered for opening of financial bid. <p>Stage II: Financial Bid Evaluation</p> <p>The financial bid evaluation will be based on price quoted by the bidder (BoQ). The tender will be awarded to the overall L1 bidder for the total work (Comprising all items).</p>
15	<p>Selection of successful bidder and Award of Order The order will be directly awarded to the technically qualified bidder as per the condition in para 3A of DIPP, MoCI Order No. 45021/2/2017-PP (BE II) dated 16th September 2020.</p>
16	<p>Delivery Period & Work completion: The Items should be delivered, and work should be completed and handed over within 3 months from the issue of Purchase Order.</p>
17	<p>Payment:</p> <ol style="list-style-type: none"> (i) No Advance payment will be made. However, 90% Payment against Delivery and 10% after installation are agreed to wherever the installation is involved. (ii) Advance Payment: No advance payment is generally admissible. In case a specific percentage of advance payment is required, the Vendor has to submit a Bank Guarantee from a scheduled commercial bank in India equivalent to the amount of advance payment.
18	<p>Warranty and Support:</p> <ul style="list-style-type: none"> • All items must have a comprehensive warranty and support for 3 years • The solution provider is responsible for 3 years' service support and in case of any emergency the solution provider should provide engineers on site. • Comprehensive AMC for 4th and 5th years for only active components can be quoted as separate line item, this may be quoted as optional.
19	<p>Terms and conditions: Failure to comply with any of the instructions stated in this document or offering unsatisfactory explanations for non-compliance will likely to lead to rejection of offers.</p>
20	<p>Right of Acceptance: IIT MADRAS reserves the right to reject the whole or any part of the Tender without assigning any reason or to accept them in part or full.</p>
21	<p>Transit Insurance: The Purchaser will not pay separately for Transit Insurance.</p>
22	<p>In terms of Rule 173 (iv) of General Financial Rules, 2017 the bidder shall be at liberty to question the bidding conditions, bidding process and/or rejection of its bid.</p>

23	<p>Conditions of contract: Tenderer should quote on the basis of the conditions referred to in Para of the invitation to tender and tender papers. In case these terms and conditions are not acceptable to the tenderer, he should specifically state the deviation(s) there from in the body of the tender.</p>
24	<p>Tenderer shall submit along with this Tender: Name and full address of the Banker and their swift code and PAN No. and GSTIN number.</p>
25	<p>Disputes and Jurisdiction: Settlement of Disputes: Any dispute, controversy or claim arising out of or in connection with this PO including any question regarding its existence, validity, breach or termination, shall in the first instance be attempted to be resolved amicably by both the Parties. If attempts for such amicable resolution fails or no decision is reached within 30 days whichever is earlier, then such disputes shall be settled by arbitration in accordance with the Arbitration and Conciliation Act, 1996. Unless the Parties agree on a sole arbitrator, within 30 days from the receipt of a written request by one Party from the other Party to so agree, the arbitral panel shall comprise of three arbitrators. In that event, the supplier will nominate one arbitrator and the Project Coordinator of IITM shall nominate an arbitrator. The Dean IC&SR will nominate the Presiding Arbitrator of the arbitral tribunal. The arbitration proceeding shall be carried out in English language. The cost of arbitration and fees of the arbitrator(s) shall be shared equally by the Parties. The seat of arbitration shall be at IC&SR IIT Madras, Chennai. a. The Applicable Law: The Purchase Order shall be construed, interpreted and governed by the Laws of India. Court at Chennai shall have exclusive jurisdiction subject to the arbitration clause. Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Chennai in Tamil Nadu.</p>

26	<p>Force Majeure: The Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure. For purposes of this Clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not limited to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes. If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.</p>
27	<p>Risk Purchase Clause: In event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from the other source on the total risk of the supplier under risk purchase clause</p>
28	<p>All information including selection and rejection of technical or financial bids of the prospective bidders will be communicated through e-Tender portal. In terms of Rule 173(iv) of General Financial Rule 2017, the bidder shall be at liberty to question the bidding conditions, bidding process and/or rejection of bids.</p>
29	<p>The tenderer shall certify that the tender document submitted by him / her are of the same replica of the tender document as published by IIT Madras and no corrections, additions and alterations made to the same. If any deviation found in the same at any stage and date, the bid / contract will be rejected / terminated and actions will be initiated as per the terms and conditions of the contract.</p>
30	<p>Due to Covid-19 pandemic the bidders will not be entertained to participate in opening of Bids. Since the tender is e-tender, the opening of the bids may be checked using the respective logins of the bidders.</p>

ACKNOWLEDGEMENT

It is hereby acknowledged that I/We have gone through all the points listed under “Specification, Guidelines, Terms and Conditions” of tender document. I/We totally understand the terms and conditions and agree to abide by the same.

**SIGNATURE OF TENDERER ALONG WITH SEAL OF THE
COMPANY WITH DATE**

ANNEXURE – 1
SUPPLY, INSTALLATION AND COMMISSIONING OF AUDIO AND VIDEO
CONFERENCE SYSTEM FOR SMART CLASSROOM of IIT MADRAS AS PER DESIGN

(A) PRE-QUALIFICATION CRITERIA

1. Bidder Eligibility Criteria I:

1.1 Only 'Class-I local suppliers' and 'Class-II local suppliers', as defined under DIPP, MoCI Order No. P-45021/2/2017-PP (BE II) dated 16th September 2020 and other subsequent orders issued therein, shall be eligible to bid in this tender. Declaration for Class-I and Class-II local suppliers should be submitted in the prescribed proforma format as per **Annexure-6**

1.2 Bidder should confirm their acceptance that they comply with the provisions with report to "Guidelines for eligibility of a bidder from a country which shares a land border with India as detailed at **Annexure-7**. The bidder should submit Certificate for "Bidder from/ Not from Country sharing Land border with India & Registration of Bidder with Competent Authority" as per Order of DoE F.No.6/18/2019-PPD dated 23.07.2020 as mentioned.

2. Bidder Eligibility Criteria II:

2.1 The firm should not have been blacklisted / debarred by any Government/ regulatory bodies in India. A self-declaration format given in **Annexure – 9**

2.2 The bidder should submit OEM authorization for the mentioned items Sr# 1 to 4, 6 to 18, 20 and 24 to 27 Make/brand of item for which they are submitting the bid (format is given in **Annexure-10**).

2.3 The bidder should have similar experience in the last 3 years (2020, 2021 and 2022) in Govt. Institutions/any of Central PSU's / any of central Government/ autonomous bodies/reputed firms in executing the following works (any one category).

i) Two (2) similar contracts each costing not less Rs. 50 Lakhs
(Or)

ii) One (1) similar contract costing not less than Rs. 1 Crore

Copies of the documents listed below should be submitted as a proof for the above work experience:

i) Purchase Order

ii) Work Completion Certificates

iii) User Performance Certificate from End User

2.4 The bidder shall have an annual financial turnover of not less than Rs. 2 Crores (Rupees two Crores only) during any two of the last three financial years i.e. 2020-21, 2021-22 and 2022-23. (Financial statements / certificates issued by Chartered Accountant should be submitted as proof)

(B) SCOPE OF WORK

1. The tender is called for setting up Smart Classroom which includes supply, installation and commissioning of Audio and Video conference system.

2. The bidder is required to commission the Audio and Video conference system as per our design (Annexures) & specification given below:

- Classroom should have 2 no's of 98" display for presentation and 1 no's of Interactive 85" display in the centre for white boarding in centre and one 85" display at rear end as a presenter reference monitor.
- The speakers should be placed in false ceiling and the ceiling array microphones should be positioned for voice lift application.
- Each array microphone should have voice lift capability and room should be fine-tuned for Voice lift Application.
- The Presenter should have the separate monitor for content viewing and should be able to annotate on top of the content being presented.
- Smart Classroom should be enabled with soft conferencing facility with 2 cameras covering the participants and 1 camera to capture the presenter with AI enabled auto tracking feature.
- Any participant in the Smart classroom should be able to connect wirelessly their electronic gadgets like laptops for the presentation.
- Smart Classroom should have capability to send all the camera feed simultaneously during soft conference.
- Entire AV controls should be enabled Via iPad.

3. Any change in the above design is not permitted

4. The bidder can be an OEM or an authorized dealer (format is given in **Annexure-10**)

5. The floor plan of the Smart Classroom is given in **Annexure – 2**.

6. The AV Line Diagram is given in **Annexure -3**.

7. The desired brand of materials required to be used by the successful bidder with quantity in the proposed audio, video system is given in the list of Bill of Materials. The vendor should not alter the Quantity mentioned in the BOM.

8. The bidder should use the Quantity mentioned in the Bill of Material for designing and should choose any of one of the mentioned brands/make of items as per BOM.

9. Any other brand other than what mentioned in BOM will not be accepted.

10. The audio and video conferencing system should be commissioned with acoustics and the whole system should be fine-tuned for excellent output.

11. For any technical clarification, Kindly contact Mr. Ilayaraja E ([044] 2257 9794).

(C) BILL OF MATERIAL

Sr#	Description	Make	UoM	Qty
1	98" UHD Display	SAMSUNG / LG / PANASONIC	Nos.	2
2	85" UHD Interactive Display	SAMSUNG / LG / PANASONIC	No.	1
3	85" UHD Display	SAMSUNG / LG / PANASONIC	No.	1
4	PTZ Camera	PANASONIC / SONY	Nos.	3
5	Auto Tracking Software for PTZ Camera	PANASONIC / SONY	No.	1
6	24" Touch Display	WACOM / VIEWSONIC	No.	1
7	12.9" iPad	APPLE	No.	1
8	Wireless Presentation System with Power Injector	EXTRON / AMX	No.	1
9	16x8 HDMI Matrix switcher	EXTRON / AMX / LIGHTWARE	No.	1
10	HDMI Wallplate Twisted Pair Transmitter	EXTRON / AMX / LIGHTWARE	No.	1
11	HDMI Twisted Pair Transmitter	EXTRON / AMX / LIGHTWARE	Nos.	10
12	HDMI Twisted Pair Receiver	EXTRON / AMX / LIGHTWARE	Nos.	11
13	4K HDMI Seamless Multiview Presentation Matrix Switcher cum Scaler with USB Capture card	HALLTECH / EXTRON / KRAMER	No.	1
14	USB Twisted Pair Extender (Transmitter & Receiver)	EXTRON / AMX / GEFEN	Nos.	3
15	USB3.0 Host Switcher	INOGENI / EXTRON	No.	1
16	HDMI & Audio USB Bridge	INOGENI / EXTRON / EPIPHAN	No.	1
17	5Gbps 4 Port SuperSpeed USB 3.0 Hub	STARTECH / AMKETTE	No.	1
18	Ceiling Tile Microphone	SENNHEISER / SHURE / CLEARONE	Nos.	4
19	16 Port Unmanaged POE+ Switch	NETGEAR / TP LINK / D-LINK	No.	1
20	Digital Signal Processor	QSC / BIAMP / SYMETRIX	No.	1
21	UCI Deployment Software License for DSP	QSC / BIAMP / SYMETRIX	No.	1
22	Scripting Engine Software License for DSP	QSC / BIAMP / SYMETRIX	No.	1
23	Software DANTE License for DSP	QSC / BIAMP / SYMETRIX	No.	1
24	Two Channel Amplifier	QSC / LABGRUPPEN / POWERSOFT	No.	1
25	Eight Channel Amplifier	QSC / LABGRUPPEN / POWERSOFT	No.	1
26	Ceiling Speaker	QSC / TANNOY / MAYER SOUND	Nos.	18
27	AV Controller	EXTRON / AMX	No.	1
28	10.2" iPad	APPLE	No.	1
29	Wi-Fi Access Point	TP LINK / CISCO / D-LINK	No.	1
30	USB Faceplate	INTEGRATOR / CUSTOM	No.	1
31	6 Feet HDMI Male to Male Cable	EXTRON / KRAMER	Nos.	29
32	9 Feet HDMI Male to Male Cable	EXTRON / KRAMER	No.	1
33	6 Feet USB 3.0 Type A Male to Type B Male Cable	KRAMER / STARTECH / EXTRON	Nos.	4
34	6 Feet USB 2.0 Type A Male to Type B Male Cable	KRAMER / STARTECH / EXTRON	Nos.	4
35	10 Feet USB 2.0 Type A Male to Type B Male Cable	KRAMER / STARTECH / EXTRON	No.	1
36	10 Feet USB 2.0 Type A Male to Type A Male Cable	KRAMER / STARTECH / EXTRON	No.	1
37	Shielded Twisted pair Cable	KRAMER / EXTRON	Meters	900

38	RJ45 Connector	KRAMER / EXTRON	Nos.	50
39	Twisted Pair Cable for Control	COMMSCOPE / KRAMER	Meters	150
40	Serial Control / Audio Cable	EXTRON / AMX / BELDEN	Meters	20
41	Speaker Cable	EXTRON / AMX / BELDEN	Meters	300
42	DVI-D Male to HDMI Female Adapter Cable	KRAMER / STARTECH	Nos.	2
43	17U AV Rack with 650mm Depth	VALRACK / VERO PRESIDENT	No.	1
	Power Distribution Unit Vertical		No.	2
	Rack Shelf		Nos.	6
	1U - Blank Spacer		Nos.	4
	Rack Equipment Cooling Fan		Set	1
	Castor Wheels with Lock		Set	2
44	Heavy Duty Wall Mount for 98" Display	INTEGRATOR / CUSTOM	Nos.	2
45	Heavy Duty Wall Mount for 85" Interactive Display	INTEGRATOR / CUSTOM	No.	1
46	Heavy Duty Ceiling Mount for 85" Display	INTEGRATOR / CUSTOM	No.	1
47	Ceiling Mount for Camera	INTEGRATOR / CUSTOM	Nos.	3
48	Required AV Connectors and long run cables	NEUTRICK / AMPHENOL	Lot	1
49	Conceptualization, Design Engineering, Supply, Installation & Commissioning, Documentation & One Time User Orientation Charges	INTEGRATOR / SERVICES	Ls	1
50	L1 support engineer to address the AV issue onsite for smart class room (Optional for 1 year from the date of handover)	-	Nos.	1
51	Comprehensive AMC should be quoted for 4 th year only for active components (Optional)	-	Nos.	1
52	Comprehensive AMC should be quoted for 5 th year components (Optional)	-	Nos.	1

(D) DETAILED TECHNICAL SPECIFICATIONS

1. 98" UHD Display

Item Reference	1
Item Description	98" UHD display
Make/Brand	SAMSUNG / LG / PANASONIC
Minimum Performance Parameters	
Panel	
Diagonal Size	98"
Type	Direct LED
OS	Tizen 4.0 or Equivalent
Resolution	3840*2160 (4K UHD)
Pixel Pitch(mm)	Min. 0.562 x 0.562 (mm)
Active Display Area(mm)	2158.848(H) x 1214.352(V)
Brightness(Typ.)	350 nits and above
Contrast Ratio	1200:1 and above
Viewing Angle(H/V)	Min 178/178

Response Time(G-to-G)	8ms (Typ.)
Display Colors	16.7M
Color Gamut	0.72
Panel	Anti-Glare Panel or Equivalent
Operation Hour	24/7
Display	
Dynamic C/R	Mega
H-Scanning Frequency	30 ~ 81kHz
V-Scanning Frequency	48 ~ 75Hz
Maximum Pixel Frequency	594MHz
Input Connectivity	
RGB	DVI-D, Display Port 1.2 (1)
Video	HDMI 2.0 (2)
HDCP	HDCP2.2
Audio	Stereo mini-Jack, DVI, HDMI
USB	USB 2.0 x 2
Output Connectivity	
RGB	HDMI 2.0 (Loop-out)
Audio	Stereo mini-Jack
External Control	RS232C(in/out) thru stereo jack, RJ45
External Sensor	IR
Power	
Power supply	AC 100 - 240 V, 50/60 Hz
Power consumption	462.0 Max [W/h]
BTU	1576.41 Max

2. 85" UHD Interactive Display

Item Reference	2
Item Description	85" UHD Interactive Display
Make/Brand	SAMSUNG / LG / PANASONIC
Minimum Performance Parameters	
Panel	
Diagonal Size	85"
OS	Tizen 6.0 / Equivalent
Resolution	3840*2160 (4K UHD)
Brightness(Typ.)	350 nits and above
Contrast Ratio	1200:1 and above
Viewing Angle(H/V)	Min 178/178
Response Time(G-to-G)	Maximum 7ms (Typ.)
Display Colors	Minimum 16.7M

Touch	
Type	IR
# Of Drawing	4 drawing (Internal) 20 touch (External)
Touch Pen Type	Passive Pen with magnet
Object Recognition Range	2mm/ 4mm / 8mm / 50mm (Brush Mode : Dynamic Object Recognition)
Hardness	Heat Semi-Strengthened Glass
Thickness	3.2T
Input Connectivity	
Video	HDMI 2(Rear 1, Front 1), DP 1, OPS I/F
USB	2(For SoC, Rear/Front), 2 (for external 2.0 x1/3.0x1(Front))
Output Connectivity	
Video	HDMI 1 (Screen Share, Rear)
Audio	Stereo mini-Jack
Touch Out	Touch Out 2 (USB Upstream Type, Front 1, Rear 1)
External Control	Touch Input / RS232C thru stereo jack, RJ45(For MDC)
Power	
Power supply	AC 100 - 240 V, 50/60 Hz
Power consumption	418 (OPS 19V/3.7A) Max [W/h]
BTU	1,425.38 (OPS 19V/3.7A) Max

3. 85" UHD Display

Item Reference	3
Item Description	85" UHD display
Make/Brand	SAMSUNG / LG / PANASONIC
Minimum Performance Parameters	
Panel	
Diagonal Size	85"
Type	Direct LED
OS	Tizen 4.0 / Equivalent
Resolution	3840*2160 (4K UHD)
Pixel Pitch(mm)	Max 0.4875 x 0.4875 (mm)
Active Display Area(mm)	1872(H) x 1053(V)
Brightness(Typ.)	300 nits or above
Contrast Ratio	Minimum 4000:1
Viewing Angle(H/V)	Min 178/178
Response Time(G-to-G)	Maximum 8ms (Typ.)
Display Colors	Minimum 16.7M
Color Gamut	0.72
Operation Hour	Min. 16/7
Display	
Dynamic C/R	Mega

H-Scanning Frequency	30 ~ 81kHz
V-Scanning Frequency	48 ~ 75Hz
Maximum Pixel Frequency	594MHz
Input Connectivity	
Video	HDMI 2.0 (2)
HDCP	HDCP2.2
Audio	Stereo Mini Jack, HDMI/Audio(Common)
USB	USB 2.0 x 1
Output Connectivity	
Audio	Stereo mini-Jack
External Control	RS232C(in) thru stereo jack, RJ45
Power	
Power supply	AC 100 - 240 V, 50/60 Hz
Power consumption	273.0 Max [W/h]
BTU	930.9 Max

4. PTZ Camera

Item Reference	4
Item Description	PTZ Camera
Make/Brand	PANASONIC / SONY
Minimum Performance Parameters	
Image Sensors	1/2.5-type 4K MOS x1
Effective Pixels	Approx. 8,490,000 pixels
Lens	<ul style="list-style-type: none"> Motorized Optical 24x zoom, F1.8 to F4.0 [f=4.12 mm (5/32 inches) to 98.9 mm (3-29/32 inches) 35 mm (1-3/8 inches) equivalent: 25.0 mm (31/32 inches) to 600.0 mm (23-5/8 inches)]
Zoom	Optical zoom: 24x (Min) i.Zoom UHD 28x, FHD 36x Digital extender zoom: 1.4x, 2x (Min)
Angle of View Range	Horizontal angle of view: Min 74.1° (wide) to 3.3° (tele) Vertical angle of view: Min 46.0° (wide) to 1.9° (tele) Diagonal angle of view: Min 81.8° (wide) to 3.8° (tele)
Focus	Switching between auto and manual
Focus Distance	Entire zooming range: Min 1200 mm (3.9 ft) Wide end: Min 100 mm (0.33 ft)
Minimum Illumination	3 lx (F1.8, 59.94p, 50IRE, 42 dB, without accumulation)
Horizontal Resolution	UHD: 1,500 Typ (Center area) FHD: 1,000 Typ (Center area)
Gain Selection	Auto, 0 dB to 36 dB
Gamma	HD / Normal / Cinema1 / Cinema2 / Still Like
White Balance	ATW : 3200 K, 5600 K (ATW Speed 3-stage variables) AWB : AWB-A / AWB-B VAR (selectable between 2000 K and 15000 K by designating a value)
Chroma Amount Variability	OFF, -99 % to 99 %
Scene File	Full Auto, Scene1, Scene2, Scene3
Output Format (HDMI)	4K - 2160/29.97p , 2160/25p , 2160/24p , 2160/23.98p

	HD - 1080/59.94p, 50p, 1080/59.94i, 50i, 1080/29.97p , 25p , 23.98p (over59.94i), 1080/24p , 23.98p , 720/59.94p, 50p
Video Output (HDMI)	HDMI 1.4 connector 4:2:2/10bit
Input/Output Connector	
LAN	LAN terminal for IP control (RJ-45)
RS-422	CONTROL IN RS422A (RJ-45)
USB	USB2.0 DEVICE, Type C connector, no USB bus-powered function Only compatible with UVC (USB Video Class)UVC 1.0, UAC 1.0
MIC/LINE input (HDMI/IP)	Φ3.5 mm stereo mini jack <ul style="list-style-type: none"> • MIC input • LINE input
Pan-tilt Head Unit	
Installation Method	Stand-alone (Desktop) or suspended (Hanging)
Pan/tilt Operation Speed	Speed range: 0.08°/s to 60°/s (Normal mode) 3 speed modes installed Normal: 60°/s, Fast1: 90°/s, Fast2: 180°/s
Panning Range	±175°
Tilting Range	- 30° to 90°*8
Quietness	NC25 or less
IP Streaming	
Image Streaming Mode	JPEG (MJPEG), H.264, H.265, NDI® HX - Up gradable (Optional)
Image Resolution	1920x1080, 1280x720, 640x360, 320x180
Image Transmission Setting	JPEG. H.264, H.265
NDI® Support - Optional (On chargeable basis)	
NDI Support	NDI® HX version 2 : Available to upgrade (chargeable)
Image Resolution (NDI® HX)	1920x1080, 1280x720

5. Auto Tracking Software for PTZ Camera

Item Reference	5
Item Description	Auto Tracking Software for PTZ Camera
Make/Brand	PANASONIC / SONY
Minimum Performance Parameters	
Specification	Software Needs to work with Above mentioned PTZ Camera Facial Recognition and Human Body Detection for Accurate Auto-tracking Detects registered faces even in challenging conditions Auto Zoom Linking a wide-angle camera (AW-SF100 only) One Time License Various settings can be registered as presets for easy operation Works With windows OS

6. 24" Touch Display

Item Reference	6
Item Description	24" Touch Display
Make/Brand	WACOM / VIEWSONIC
Minimum Performance Parameters	
Technology	Electromagnetic Resonance (EMR)

Screen dimensions	23.8" diagonal (20,7 x 11.75 inches / 527 x 296 mm)
Native resolution	1920 x 1080 pixels
Aspect ratio	16:9
Coordinate Resolution	2540 lpi
Cover glass surface	Tempered AG etched glass or equivalent
Report rate	187 points per second
Pressure levels	Up to 2048
Video input	DVI-I
Communication interface	USB 2.0
Programmable buttons	Min 4
Response time	16 ms (typical)
Stand inclination	11° - 73° adjustable stand
Power supply	AC 100 ~ 240V, 50/60 Hz
Power consumption	40 W or lower, Power Save mode: 0.5 W or lower, Power OFF mode: 0.5 W or lower
Supported operating systems	Windows 10 / 8.1 / 7 (32-bit, 64-bit) Mac OSX 10.11 or later

7. 12.9" iPad

Item Reference	7
Item Description	12.9" iPad
Make/Brand	APPLE
Minimum Performance Parameters	
Display	Liquid Retina XDR display & 32.77 cm / 12.9-inch (diagonal) mini-LED backlit Multi Touch display with IPS technology
Display Resolution	2732x2048-pixel resolution at 264 pixels per inch (ppi)
Processor Chip	Apple M2 chip 8-core CPU with 4 performance cores and 4 efficiency cores 10-core GPU 16-core Neural Engine 100GB/s memory bandwidth
Memory	Min 128 GB
Colour	Space Grey
Wi-Fi and Cellular	Wi Fi 6E (802.11ax) with 2x2 MIMO, simultaneous dual band (2.4GHz and 5GHz) Bluetooth 5.3 technology Wi-Fi + Cellular models 5G (sub?6 GHz) with 4x4 MIMO Gigabit LTE with 4x4 MIMO and LAA
Sensors	Face ID LiDAR Scanner Three-axis gyro Accelerometer Barometer Ambient light sensor
OS	iPadOS 16

8. Wireless Presentation System with Power Injector

Item Reference	8
Item Description	Wireless Presentation System with Power Injector

Make/Brand	EXTRON / AMX
Minimum Performance Parameters	
Equipment Type	BYOD Wireless Presentation Device for secure collaboration
Input	1 x HDMI 2.0 or more, 1 x USB or more, 2 x RJ 45 Gigabit Ethernet 10/100/1000 BaseT
Output	1 x HDMI 2.0 / Display port or better
Resolution	4K or better
Features	<ul style="list-style-type: none"> Should have fully customizable welcome screen & Video screen saver & should enable the moderator to select which user can access the display and how the content is displayed. Dual Gigabit Ethernet connections, should have segmentation of internal private networks on one Ethernet from external guest networks on another Ethernet for better Authorisation. Shall a feasibility to add Miracast in future. Shall a feasibility to add live stream decoding from classrooms with same hardware.
HDCP & EDID	Should be HDCP2.3 compliant & have EDID management
Audio Inputs/Outputs	1x embedded audio on HDMI input or better, 1x analog stereo, balanced/unbalanced output
Simultaneous Display	Full screen or four window Simultaneous display of content from 4 different sources through software app. Wired and wireless sources should be able to collaborate simultaneously
Data encryption	128-bit, security protocols to ensure that all content transmitted between BYOD devices and this unit is fully encrypted and secure
Software and control options	Windows, Android & iOS
Additional Feature	It should enable meeting content to display on a participant's mobile device
Power options	PoE+ enabled
Power	High Power Injector with Required Mounting Kit
Controls	USB, LAN, CEC over HDMI cable or better

9. 16x8 HDMI Matrix switcher

Item Reference	9
Item Description	16x8 HDMI Matrix switcher
Make/Brand	EXTRON / AMX / LIGHTWARE
Minimum Performance Parameters	
Input	Should have Min 16 HDMI or More
Output	Should have Min 8 HDMI or More with Min 4 De-embedded Analog Audio Output or more
Video Standards	HDMI 2.0b or better with HDR Support
Resolution Support	4K/60 @ 4:4:4 or better with minimum 18 Gbps data rate on single port. Shall support Colours up to 10 Bit (Billion Colors)
Audio Input / Output	Input: Embedded for all HDMI input. Output: Embedded Audio on the HDMI Output Ports and Min 4 De-embedded audio from HDMI Inputs with Volume Control & Audio Breakaway Feature
HDMI I/O Sensitivity	Automatic input cable equalization & HDMI output regeneration to preserve the reliable HDMI signal extension. HDMI Outputs shall provide Min 250mA Per Port to power the Active Cables if connected to it.
HDCP & EDID	Should be HDCP2.3 compliant & have inbuilt EDID management

Ethernet	10/100 Base-T Ethernet for monitoring and control
Controls	Front panel buttons with indication, Ethernet/ RS 232, CEC & USB
Power Save mode	Should unit be placed in a low power standby state to conserve energy when not in use
Certification	Should be a JITC certified
Regulatory compliance	CE, C-tick, c-UL, FCC Class A, ICES, PSE, UL, VCCI, RoHS, and WEEE

10. HDMI Wallplate Twisted Pair Transmitter

Item Reference	10
Item Description	HDMI Wallplate Twisted Pair Transmitter
Make/Brand	EXTRON / AMX / LIGHTWARE
Minimum Performance Parameters	
Video Input	Min 1 x HDMI
Audio Input	Shall Support HDMI Embedded Audio and shall accept analog stereo audio signals
Output	1 x CATx on RJ 45 port
Resolution Support	Min 4K
Data Rate	Min 10.2 Gbps
HDCP	Min HDCP 2.3 or better
Transmission distance	100 Mtr or more over CATx cable
Audio Output	Transmits analog stereo input over the CATx cable to the receiver
EDID	Should support EDID pass-through
Control Input	Min 1 RS232 & 1 IR
HDCP	HDCP Compliant
Remote power	Transmitter should support both local power supply and direct powered from receiver
Certification	Should be a JITC certified
Compliance	c-UL, UL
Temperature/humidity	Operating Temp: +32 to +120 °F (0 to +49 °C) or better Operating Humidity : 10% to 90%, noncondensing or better

11. HDMI Twisted Pair Transmitter

Item Reference	11
Item Description	HDMI Twisted Pair Transmitter
Make/Brand	EXTRON / AMX / LIGHTWARE
Minimum Performance Parameters	
Video Input	Minimum 1 HDMI (HDMI 1.4)
Output	Twisted pair on RJ 45 port
Resolution Support	4K@30Hz, 8-bit 4:4:4 or better
Data Rate	Min 10.2 Gbps
Format Supported	RGB and YCbCr digital video
Color Bit Depth	Up to 12-bit or better
Video Standards	HDMI 1.4
Transmission distance	100 Mtr or more over CATx Cable

Embedded Audio Support	HD lossless audio format
Audio Output	Transmits analog stereo input over the TP cable to the receiver
EDID	Should support EDID pass-through
Additional Signals	Should extend RS-232 & IR bidirectionally
HDCP	Min HDCP 2.3 or better
Power	Transmitter should support both included power supply and remote powering from Matrix
Installation	Box Type and UL2043 Plenum rated
Cooling	Convection Cooled and No Vents
Temperature/humidity	Operating Temp: +32 to +120 °F (0 to +49 °C) or better Operating Humidity : 10% to 90%, noncondensing or better
CEC	Should support CEC pass-through
Compliance	CE, c-UL UL, C-tick, FCC Class A**, ICES, VCCI

12. HDMI Twisted Pair Receiver

Item Reference	12
Item Description	HDMI Twisted Pair Receiver
Make/Brand	EXTRON / AMX / LIGHTWARE
Minimum Performance Parameters	
Video Input	Twisted pair on RJ 45 port
Output	Minimum 1 HDMI (HDMI 1.4)
Resolution Support	4K@30Hz, 8-bit 4:4:4 or better
Data Rate	10.2 Gbps or better
Format Supported	RGB and YCbCr digital video
Color Bit Depth	Up to 12-bit or better
Video Standards	HDMI 1.4
Transmission distance	70 Mtr or more over CATx Cable
Embedded Audio Support	HD lossless audio format
Audio Output	Receives analog stereo audio over the TP cable to the receiver
EDID	Should support EDID pass-through
Additional Signals	Should extend RS-232 & IR bidirectionally
HDCP	Min HDCP 2.3 or better
Power	Receiver should support both local power supply and remote powering from Matrix
Installation	Box Type and UL2043 Plenum rated
Cooling	Convection Cooled and No Vents
Temperature/humidity	Operating Temp: +32 to +120 °F (0 to +49 °C) or better Operating Humidity : 10% to 90%, noncondensing or better

13. 4K HDMI Seamless Multiview Presentation Matrix Switcher cum Scaler

Item Reference	13
Item Description	4K HDMI Seamless Multiview Presentation Matrix Switcher cum Scaler
Make/Brand	HALLTECH / EXTRON / KRAMER
Minimum Performance Parameters	

HDMI Video Inputs	Minimum of 4 x HDMI Video Inputs
HDMI Video Input Resolution	Minimum up to uncompressed 4K60 4:4:4 (18 Gbps bandwidth, HDMI 2.0 & HDCP 1.4, 2.2)
HDMI Video Outputs	Minimum of 2 x HDMI Video Outputs
HDMI Video Output Resolutions	Minimum up to uncompressed 4K60 4:4:4 (18 Gbps bandwidth, HDMI 2.0 & HDCP 1.4, 2.2)
HDMI Matrix	Minimum of 4x2 Matrix Switching
Seamless Switching	Seamless Switching with zero blanking frame on both HDMI Outputs
Multiwindow Layouts	Picture-in-Picture (PIP) on Both HDMI Outputs
Multiwindow Layouts	Picture-over-Picture (POP) on Both HDMI Outputs
Customizable Window Layouts	Should support combination of PIP & POP up to minimum of 4 Windows
Multiwindow Layouts	Selection of Presets from Front Panel, Web GUI & 3rd party Control Systems
Multiwindow Layouts	Selection Video Inputs of Layout from Front Panel, Web GUI & 3rd party Control Systems
Multiwindow Layouts	MultiWindow Layout Output directly onto USB 3.0 interface (Capture card)
Recording	Should support Record and Save to USB2.0 port connected with external storage device
Audio Input	Balanced / Un-Balanced Audio Input usable for Microphone / Content
Microphone Input	Balanced Mic Input with 48V Phantom and line level audio support
Audio Output	Un-Balanced / Balanced stereo 5-pin Phoenix connector
Audio Mixer Capability	Mixer Output directly into a single USB 3.0 interface & also Audio Output Connectors
	HDMI Content / Microphone Mixing capability & provided mixing on to Video Output on USB / HDMI
	Both Audio Embedding & De-Embedding on HDMI, Balanced & Un-Balanced Connectors
Control Interface Protocols	1) IR 2) RS-232 3) Telenet / TCP-IP LAN 4) Web GUI
Button functionality	Front / Top Keypad for Multiview Layout Selection
	Front / Top Keypad for Audio Controls (Mic & Program)

14. USB Twisted Pair Extender (Transmitter & Receiver)

Item Reference	14
Item Description	USB Twisted Pair Extender (Transmitter & Receiver)
Make/Brand	EXTRON / AMX / GEFEN
Minimum Performance Parameters	
USB Host port	Min 1 USB type-B female port
USB peripheral hub	Min 4 USB Type- A female ports hub
USB support	Shall support USB 2.0, 1.1, or 1.0 peripherals and USB 3.0 peripherals that can operate at USB 2.0 rates
USB data rates	Shall support Low speed (1.5 Mbps), full speed (12 Mbps), high speed (480 Mbps)
Output Voltage	5 Volts, 500 mA on each port or equivalent
Peripheral emulation	Should have Peripheral emulation for a continuous connection between the host and an HID-compliant keyboard and mouse
Distance	Should Extend USB peripherals up to 330 feet (100 meters) point-to-point over one CATx cable or 1,980 feet (600 meters) through a Gigabit Ethernet network

Control	Should provide a front panel button in both transmitter and receiver to pair up the transmitter and receiver manually if required
Additional Features	Same Hardware should be capable to be upgraded to a USB Matrix Switcher with additional Hardware/Software
Regularity Compliance	CE, C-Tick, c-UL, FCC Class A, ICES, VCCI

15. USB3.0 Host Switcher

Item Reference	15
Item Description	USB3.0 Host Switcher
Make/Brand	INOGENI / EXTRON
Minimum Performance Parameters	
USB Device / Pheripheral Ports	Minimum of 3 x USB 3.0 Pheripheral Ports
Compatibility of Pheripheral Ports	Both USB 2.0 & USB 3.0 formats (Minimum of 5 Gbps)
Host Ports	Minimum of 2 x USB 3.0 Host Ports (connectivity of up to 2 PCs)
Compatibility of Host Ports	Both USB 2.0 & USB 3.0 formats (Minimum of 5 Gbps)
Modes of Operation	a) Automatic Mode b) Manual Mode c) Remote control (RS-232 control & GPI control)
Automatic Mode	This mode Should switch automatically to the last PC1 connected. If the current PC is disconnected, the device will switch back to the other PC if it is detected. Push-button action and remote control are also supported.
Manual Mode	The manual mode will enable you to force a specific PC selection. Push-button action and remote control are also supported. It is possible to turn OFF both PCs in manual mode.
Remote Control (Serial)	3.5 mm captive screw connector, 3 pole (RS-232) with Valid Serial Protocols & Settings for control from 3rd party Control Systems
Remote Control (GPIN)	Should allow Contact-closure control. Should be Controlled by open-drain IO (short to ground) or driven IO. Should Support voltage range: 0V to +12V max & with Voltage threshold up to 2.3V.
Power Source	External power supply can provide power to the USB 3.0 devices (1.8A shared current limit) or equivalent
USB3.0 Compatibility with Software / OS	USB3.0 Compatibility with Software / OS
USB3.0 Compatibility with Software / Drivers	Plug & Play for without any need to install any Drivers & no need of major Setup

16. HDMI & Audio USB Bridge

Item Reference	16
Item Description	HDMI & Audio USB Bridge
Make/Brand	INOGENI / EXTRON / EPIPHAN
Minimum Performance Parameters	
HDMI Video Input	Minimum of 1 x HDMI Video Camera / Content Input
HDMI Input Video Resolution Support	Ultra HD 4K (3840/4096x2160) at 30 fps, 1440p, 1080p at 60fps, 1080i, 720p, 480p, and 576p
HDMI Input Graphic Resolution Support	1920x1200, 1280x1024, 1280x960, 1024x768, 800x600, 640x480
Video Outputs	Min HDMI x 1no
Video Outputs	Min USB3.0 x1no Type C
Power Source	Should be powered on USB C
Audio Input	Un-Balanced Audio Input usable for Microphone / Content
Audio De-Embedder	Mixed Audio (as per Mixer Functionality)

	HDMI / USB Video Source Audio De-Embedding
Audio Mixing & Output	Content / Camera / Microphone Mixing capability & provided mixing on to Video Output on USB / HDMI.
Visca Port	PTZ control for camera thru Zoom or similar UC software.
Digital Fluid technology	For support of Internal frame buffers maximize frame rate with any PC
Colour Space & Sampling Conversion	Hardware-based Colour space and sampling conversion
Scaling and Frame rate conversion	Automatic scaling and frame rate conversion & not required to be supporting UHD up-scaling (can be added advantage to have up-scaling)
Customizable video processing functions Image controls like	Brightness, contrast, saturation and Hue settings. These controls should work on all formats below 4K (not required to be on 4K Video format)
USB3.0 Compatibility with Software / OS	Compatible with Windows 8 or above , Mac OS X and Linux
USB3.0 Compatibility with Software / Drivers	Plug & Play for without any need to install any Drivers & no need of major Setup

17. 5Gbps 4 Port SuperSpeed USB 3.0 Hub

Item Reference	17
Item Description	5Gbps 4 Port SuperSpeed USB 3.0 Hub
Make/Brand	STARTECH / AMKETTE
Minimum Performance Parameters	
Interface	Min USB 3.2 Gen 1 (5Gbps)
External Ports	4 - USB Type-A (9 pin, 5 Gbps) 1 - USB 3.2 Type-B (9 pin, Gen 1, 5Gbps)
LED Indicators	1 - Power (Blue)
OS Compatibility	OS Independent; No additional drivers or software required
Total USB Power Output	10W
Maximum Data Transfer Rate	Min 5 Gbps (USB 3.2 Gen 1)
MTBF	24,000 Hours
Power	Power Source - AC Adapter Included Input Voltage - 100 - 240 AC Input Current - 0.35A Output Voltage - 5 DC Output Current - 2A Center Tip Polarity - Positive Plug Type - M Power Consumption (In Watts) - 10

18. Ceiling Tile Microphone with Voice lift

Item Reference	18
Item Description	Ceiling Microphone with Voicelift
Make/Brand	SENNHEISER / SHURE / CLEARONE
Minimum Performance Parameters	
Connections and Operating Elements	Dante : Dante™ interface with two RJ 45 or similar sockets : Primary and Secondary Reset : Factory reset switch or equivalent Analog Out : 3-pin terminal for analog audio out or equivalent Ethernet : RJ 45 socket for network control
Pick-up pattern	Beam pattern or equivalent
Specification	<ul style="list-style-type: none"> The microphone array shall fit within the space of a standard 650 Sq Ft The microphone array shall consist of minimum 28 pre-polarized condenser microphone capsules and shall use beamforming technology that automatically focuses on whoever is speaking in the room

	<ul style="list-style-type: none"> • The beam will automatically detect the position of the person speaking and will follow the person around the room at all times • A threshold for the detection shall be adjustable • Live monitoring of the horizontal and vertical angle of the position shall be available in the software • The microphone array shall have a Dante™ interface with two RJ 45 sockets (Primary and Secondary) for digital audio output, supporting both redundant and daisy-chain modes • The microphone array shall also feature a 3-pin terminal for analog audio output, which is compatible with Phoenix contact MCVW 1.5-3-ST-3.81 connectors • In addition, the microphone array shall have an RJ 45 Ethernet socket for network control and easy configuration and monitoring using the control software • The RJ 45 Ethernet socket shall also support Power over Ethernet, using the PoE IEEE 802.3af Class 3 standard • Supply, installation, testing & commissioning of ceiling microphone shall be designed for fixed installation in medium to large conference rooms
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19. 16 Port Unmanaged POE+ Switch

Item Reference	19
Item Description	16 Port Unmanaged POE+ Switch
Make/Brand	NETGEAR / TP LINK / D-LINK
Minimum Performance Parameters	
Number of Ports	Min 16 Gigabit Ports
PoE Budget	183W or equivalent
PoE Ports / Max power outlet	16 PoE+ ports, up to 30W per port
Mean Time Between Failures (MTBF)	2,088,514 hours
Energy Efficient Ethernet support	Yes
Jumbo frame support	Yes
Packet buffer size	1MB
PoE Auto balance	Yes
Power Supply	External - Input 54V 3.7A (200W)

20. Digital Signal Processor

Item Reference	20
Item Description	Digital Signal Processor
Make/Brand	QSC / BIAMP / SYMETRIX
Minimum Performance Parameters	
Specification	<ul style="list-style-type: none"> • Supply, Installation, Testing & Commissioning of 24 Channel Audio & Control processor with minimum 16 mic/line inputs & 8 line level audio outputs, minimum 16 channels of AEC • The processor shall have minimum 8x8 Dante channels and shall also support up to 128x128 Network audio channels via Dante or AES67 • It shall also support POTS and SIP Softphone integration for Audio conferencing and configurable 16x16 USB Audio channels via USB-B ports supporting AV USB Bridging for software or web-based conferencing applications • The processor shall also have minimum 24 bit-A/D-D/A converters, 48 kHz Sample rate, Input frequency response of 20 Hz to 20 kHz @ +21dBu, Input dynamic range > 109.5 dB at @ +24 dBu sensitivity

21. UCI Deployment Software License for DSP

Item Reference	21
Item Description	UCI Deployment Software License for DSP
Make/Brand	QSC / BIAMP / SYMETRIX
Minimum Performance Parameters	
Specification	Supply, Installation, Testing & Commissioning of Perpetual License to support third party device control via Ethernet, RS232 and GPIO

22. Scripting Engine Software License for DSP

Item Reference	22
Item Description	Scripting Engine Software License for DSP
Make/Brand	QSC / BIAMP / SYMETRIX
Minimum Performance Parameters	
Specification	<ul style="list-style-type: none"> Supply, Installation, Testing & Commissioning of Perpetual License to enable touch screen controller features in the processor It should be prepectual and have capability to connect any number of touch screen controllers including iOS/windows based touch screens

23. Software DANTE License for DSP

Item Reference	23
Item Description	Software DANTE License for DSP
Make/Brand	QSC / BIAMP / SYMETRIX
Minimum Performance Parameters	
Specification	Supply, Installation, Testing & Commissioning of Perpetual License to enable 16x16 channels of Dante in the above specified processor

24. Two Channel Amplifier

Item Reference	24
Item Description	Two Channel Amplifier
Make/Brand	QSC / LABGRUPPEN / POWERSOFT
Minimum Performance Parameters	
Specification	<ul style="list-style-type: none"> Supply, Installation, Testing & Commissioning of 2 Channel Class D amplifier Power 200W @8Ω/4Ω/70V/100V.Flexible power sharing between a pair of channels Frequency Response at 8 Ω - 20 Hz – 20 kHz +/- 0.5 dB. User-configurable operating modes (per channel):- DIP switch selectable, low impedance 4 Ω or 8 Ω,high impedance direct drive 70 V or 100 V modes (per channel),Selectable 80 Hz highpass filter offered on each channel Front panel indicators:- Power, signal (per channel), limit / mute / protect (per channel) Rear panel indicators:- Bi-Color LED signal / limit/ mute/ protect, Forced air cooling, thermally regulated fan speed, Remote standby, amplifier status enunciation on 3.5 mm connectors, Power saving features - Auto-standby

25. Eight Channel Amplifier

Item Reference	25
Item Description	Eight Channel Amplifier
Make/Brand	QSC / LABGRUPPEN / POWERSOFT
Minimum Performance Parameters	

Specification	<ul style="list-style-type: none"> • Supply, Installation, Testing & Commissioning of 8 Channel Class D amplifier • Power 200W per channel @8Ω/4Ω/70V/100V • Each pair of amplifier channels can deliver up to 400 W total power, in any ratio • Frequency Response at 8 Ω - 20 Hz – 20 kHz +/- 0.5 dBz. • Signal to Noise ratio -> 103 dB, Input impedance - >10k, balanced or unbalanced • User-configurable operating modes (per channel):- DIP switch selectable, low impedance 4 Ω or 8 Ω,high impedance direct drive 70 V or 100 V modes (per channel),Selectable 80 Hz highpass filter on each channel • Front panel indicators:- Power, signal (per channel), limit / mute / protect (per channel) • Rear panel indicators:- Bi-Color LED signal / limit/ mute/ protect, Forced air cooling, thermally regulated fan speed, Remote standby, Power saving features - Auto-standby • Size-1RU
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26. Ceiling Speaker

Item Reference	26
Item Description	Ceiling Speaker
Make/Brand	QSC / TANNOY / MAYER SOUND
Minimum Performance Parameters	
Specification	<ul style="list-style-type: none"> • Supply, Installation, Testing & Commissioning of 2-way, Ceiling-mount loudspeaker • Frequency range - 52 Hz to 20 kHz, Rated RMS Power - 80Watts or better, Sensitivity-89 dB SPL or better, Coverage Angle (-6 dB)-100° conical or better, Maximum SPL Continuous/Peak-108dB/114dB or better, Rated Impedance - 8 Ohms • Transformer Tapping - 70V/100V(60, 30, 15, 7.5watts) or better • Transducer - LF - 8-inch or better, HF- .86-inch or better coaxially mounted with LF, Material - Painted ABS polymer Baffle and painted steel grille or better • Safety rating - UL1480, UL2043 • Mounting rails and C-Ring for ceiling tile included

27. AV Controller

Item Reference	27
Item Description	AV Controller
Make/Brand	EXTRON / AMX
Minimum Performance Parameters	
Memory	Min 512MB SDRAM, 4GB Flash or better
Interfaces	<ul style="list-style-type: none"> • Minimum 8 x RS-232 bidirectional / two way (acceptable with additional modules) • Minimum 1x RJ-45 for Ethernet controllable devices, Control of minimum 40 Ethernet Devices or better • 8 or more x IR/Serial • 8 or more x Relay ports • Others: Programming, Digital I/O • 4 independently switched 12 VDC outputs
IR Learner	Inbuilt or supplied with external IR learner
IP Addressing	DHCP Server inbuilt to automatically assign IP address to AV devices connected
Security	Supports Secure protocols HTTPS, SSH, SFTP, SMTP while communicating with other devices in network
Software	Should have an own configuration/GUI development software to configure AV devices (Free Downloadable from supplied OEM's website)

Protocols	DHCP, DNS, HTTP (redirect), HTTPS, ICMP, IEEE 802.1X, NTP, SFTP, SMTP, SNMP, SSH, TCP/IP, UDP/IP
Certification	Should be a JITC certified
Regulatory compliance	CE, C-Tick, c-UL, FCC Class A, ICES, UL, VCCI
Temperature/humidity	Operating Temp : +32 to +120 °F (0 to +49 °C) or better Operating Humidity : 10% to 90%, noncondensing or Better

28. 10.2" iPad

Item Reference	28
Item Description	10.2" iPad
Make/Brand	APPLE
Minimum Performance Parameters	
Display	10.2 inch (diagonal) LED-backlit Multi-Touch display with IPS Technology
Display Resolution	2160 x 1620 pixels
Processor Chip	A13 Bionic chip with 64-bit architecture Neural Engine
Memory	Min 64 GB
Colour	Space Grey
Wi-Fi	IEEE 802.11a/b/g/n/ac
Bluetooth	Min Bluetooth 4.2
OS	iPadOS 15

29. Wi-Fi Access Point

Item Reference	29
Item Description	Wi-Fi Access Point
Make/Brand	TP LINK / CISCO / D-LINK
Minimum Performance Parameters	
HARDWARE FEATURES	
Interface	4 × 10/100Mbps LAN Ports 1 × 10/100Mbps WAN Port
Button	WPS/Reset Button Wireless On/Off Switch Power On/Off Button
External Power Supply	12VDC/1A or equivalent
Antenna	3 × 2.4GHz Antennas 2 × 5GHz Antennas
WIRELESS FEATURES	
Wireless Standards	IEEE 802.11ac/n/a 5GHz IEEE 802.11b/g/n 2.4GHz
Wireless Speeds	Min 450Mbps(2.4GHz) Min 867Mbps(5GHz)
Frequency	2.4-2.5GHz 5.15-5.25GHz
Transmit Power	≤20dBm (2.4GHz) ≤23dBm (5GHz)
Wireless Modes	Wireless Router WDS(Four Address) WDS(AP+APC)
Wireless Security	WEP WPA\WPA2 WPA-PSK\WPA2-PSK

OTHER FEATURES	
Operating System	Microsoft Windows XP/Vista/7/8/8.1/10 MAC OS, NetWare, UNIX or Linux
Environment	Operating Temperature: 0°C~40 °C (32 °F~104°F) Storage Temperature: -40°C~70 °C (-40 °F~158°F) Operating Humidity: 10%~90% non-condensing Storage Humidity: 5%~90% non-condensing
Certification	CE, RoHS

30. USB Faceplate

Item Reference	30
Item Description	USB Faceplate
Make/Brand	INTEGRATOR / CUSTOM
Minimum Performance Parameters	
HARDWARE FEATURES	
Input	USB2.0 Type A (Female)
Output	USB2.0 Type A (Female)

31. 6 Feet HDMI Male to Male Cable

Item Reference	31
Item Description	6 Feet HDMI Male to Male Cable
Make/Brand	EXTRON / KRAMER
Minimum Performance Parameters	
Resolution range	Up to 4K @ 60 Hz (4096x2160), UHD @ 60 Hz (3840x2160) 8 bit color depth, max. 18.0 Gbps data rate
Connector type	1 male type A HDMI to 1 male type A HDMI
Contacts	Gold plated
Material	Conductors: tinned copper, 28 AWG Drain wire: tinned copper, 28 AWG Shielding: fluorocopolymer tape binder, tinned copper braid Jacket: PVC
Features	<ul style="list-style-type: none"> • Ultra-flexible HDMI cables • Conforms to Premium High Speed HDMI cable performance standards • 4K/60 verified • Supports ARC and CEC • Gold-plated contacts

32. 9 Feet HDMI Male to Male Cable

Item Reference	32
Item Description	9 Feet HDMI Male to Male Cable
Make/Brand	EXTRON / KRAMER
Minimum Performance Parameters	
Resolution range	Up to 4K @ 60 Hz (4096x2160), UHD @ 60 Hz (3840x2160) 8 bit color depth, max. 18.0 Gbps data rate
Connector type	1 male type A HDMI to 1 male type A HDMI
Contacts	Gold plated
Material	Conductors: tinned copper, 28 AWG Drain wire: tinned copper, 28 AWG Shielding: fluorocopolymer tape binder, tinned copper braid Jacket: PVC

Features	<ul style="list-style-type: none"> • Ultra-flexible HDMI cables • Conforms to Premium High Speed HDMI cable performance standards • 4K/60 verified • Supports ARC and CEC • Gold-plated contacts
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33. 6 Feet USB 3.0 Type A Male to Type B Male Cable

Item Reference	33
Item Description	6 Feet USB 3.0 Type A Male to Type B Male Cable
Make/Brand	KRAMER / STARTECH / EXTRON
Minimum Performance Parameters	
Max Data Rate	4.8 Gbps
Connector type	USB 3.0 SuperSpeed Type A Male to Type B Male
Connector Plating	Nickel
Conductors	28/24AWG
Outer sheath color	Blue
Compatible	USB Specifications 1.0, 1.1 and 2.0
Features	Foil & Overall Braid Provide Maximum Protection Against EMI/RFI Molded Strain Relief & RoHS Compliant

34. 6 Feet USB 2.0 Type A Male to Type B Male Cable

Item Reference	34
Item Description	6 Feet USB 2.0 Type A Male to Type B Male Cable
Make/Brand	KRAMER / STARTECH / EXTRON
Minimum Performance Parameters	
Max Data Rate	480Mbps
Connector type	USB2.0 High Speed Type A Male to Type B Male
Connector Plating	Nickel
Conductors	28AWG
Outer sheath color	Gray
Compatible	USB Specifications 1.0 & 1.1
Features	Foil & Overall Braid Provide Maximum Protection Against EMI/RFI Molded Strain Relief RoHS Compliant

35. 10 Feet USB 2.0 Type A Male to Type B Male Cable

Item Reference	35
Item Description	10 Feet USB 2.0 Type A Male to Type B Male Cable
Make/Brand	KRAMER / STARTECH / EXTRON
Minimum Performance Parameters	
Max Data Rate	480Mbps
Connector type	USB2.0 High Speed Type A Male to Type B Male
Connector Plating	Nickel
Conductors	28/24AWG
Outer sheath color	Gray
Compatible	USB Specifications 1.0 & 1.1

Features	Foil & Overall Braid Provide Maximum Protection Against EMI/RFI Molded Strain Relief RoHS Compliant
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36. 10 Feet USB 2.0 Type A Male to Type A Male Cable

Item Reference	36
Item Description	10 Feet USB 2.0 Type A Male to Type A Male Cable
Make/Brand	KRAMER / STARTECH / EXTRON
Minimum Performance Parameters	
Max Data Rate	480Mbps
Connector type	USB2.0 High Speed Type A Male to Type A Male
Connector Plating	Nickel
Conductors	28/24AWG
Outer sheath color	Gray
Compatible	USB Specifications 1.0 & 1.1
Features	Foil & Overall Braid Provide Maximum Protection Against EMI/RFI Molded Strain Relief RoHS Compliant

37. DGKat / HDBaseT / LAN Cable

Item Reference	37
Item Description	DGKat / HDBaseT / LAN Cable
Make/Brand	KRAMER / EXTRON
Minimum Performance Parameters	
Conductors	Size: 4x2x23AWG Material: Annealed copper Diameter: 0.56mm ±0.01mm
INSULATION	Material: Skin/Foam/Skin HDPE Diameter: 1.33mm ±0.10mm Color Code: White/Blue, White/Orange, White/Green, White/Brown
SCREENING	Material: Alu/PET per pair (Alu side out)
DRAIN WIRE	Material: Tinned copper Diameter: 0.4mm ±0.01mm
JACKET	Material: LSHF Color: Blue RAL 5012 Thickness: ≥0.5mm Diameter: 7.2mm ±0.2mm Page 25 of 59
ELECTRICAL	Impedance: 1–100MHz: 100Ω ±15Ω, 100–250MHz: 100Ω ±20Ω, 250–500MHz: 100Ω ±25Ω Propagation Velocity (NVP): 76% Voltage Rating: 60V Delay Skew: <45ns Mutual Pair Capacitance: ≤42pF/m Capacitance Unbalance Pair/ground: ≤1500pF/km Conductor DC Resistance: <79.8Ω/km Pair Resistance Unbalance DC: <1.5% Dielectric Strength: 2.5kV DC (2s) Insulation Resistance (500V): >5000MΩ/km
USAGE AND ENVIRONMENTAL	Storage / Transport / Installation Temperature: 0°C to +50°C Operation Temperature: 0°C to +60°C
MECHANICAL	Maximum Pulling Tension: : 100N Bending Radius - Installed: 50mm

	Bending Radius - During Installation: 60mm
STANDARDS COMPLIANCE - EC VERIFIED	Electrical: EIA/TIA 568A, ISO/IEC 11801 Fire Performance: IEC 60332-1 Smoke Density: IEC 61034 Halogen Free: IEC 60754 RoHS: 2011/65/EU
STANDARDS COMPLIANCE	Reaction to Fire Classification: Dca-s2,d1,a1

38. RJ45 Connector

Item Reference	38
Item Description	RJ45 Connector
Make/Brand	KRAMER / EXTRON
Minimum Performance Parameters	
Specification	Designed for 24AWG to 23AWG twisted pair cables with overall cable insulation diameter — 1.40mm to 1.50mm

39. Twisted pair cable for control

Item Reference	39
Item Description	Twisted pair cable for control
Make/Brand	COMMSCOPE / KRAMER
Minimum Performance Parameters	
Type	Twisted pair cable - U/UTP (unshielded)
Conductors, quantity	8
Separator Type	Isolator / Bisector
Conductor Gauge, singles	24 AWG or better
Conductor Material	Bare copper or equivalent
Insulation Material	Polyolefin or equivalent

40. Serial Control / Audio Cable

Item Reference	40
Item Description	Serial Control / Audio Cable
Make/Brand	EXTRON / AMX / BELDEN
Minimum Performance Parameters	
Type	2-core shielded, 22 AWG high- performance, tinned copper conductor
AWG	22 AWG or better
Length	As per requirement

41. Speaker Cable

Item Reference	41
Item Description	Speaker Cable
Make/Brand	EXTRON / AMX / BELDEN
Minimum Performance Parameters	
Type	Pair of Bare Stranded Copper Cable
AWG	18 AWG or better
Length	As per requirement

42. DVI-D Male to HDMI Female Adapter Cable

Item Reference	42
Item Description	DVI-D Male to HDMI Female Adapter Cable
Make/Brand	KRAMER / STARTECH
Minimum Performance Parameters	
Cable Type	One End : DVI-D Male Port Other End : HDMI Female Port
Cable Length	1ft (0.3m)
Feature	Designed to adapt an HDMI cable to a device with a DVI input, or to adapt a DVI source to an HDMI cable

43. AV Rack

Item Reference	43
Item Description	AV Rack
Make/Brand	VALRACK / VERO PRESIDENT
Minimum Performance Parameters	
17U AV Rack	Depth – 650mm Power Distribution Unit Vertical – 2Nos Rack Shelf – 6Nos 1U Blank Spacer – 4Nos Rack Equipment Cooling Fan – 1 Set Castor Wheels with Lock – 2 Set

44. Heavy Duty Wall Mount for 98" Display

Item Reference	44
Item Description	Heavy Duty Wall Mount for 98" Display
Make/Brand	INTEGRATOR / CUSTOM
Minimum Performance Parameters	
Product Category	Heavy Duty Wall Mount to hold 98" Display
Vesa Compatible	800 X 400
Max. Load Carrying Capacity	110Kg

45. Heavy Duty Wall Mount for 85" Interactive Display

Item Reference	45
Item Description	Heavy Duty Wall Mount for 85" Interactive Display
Make/Brand	INTEGRATOR / CUSTOM
Minimum Performance Parameters	
Product Category	Heavy Duty Wall Mount to hold 85" Interactive Display
Vesa Compatible	600 X 400
Max. Load Carrying Capacity	100Kg

46. Heavy Duty Ceiling Mount for 85" Display

Item Reference	46
Item Description	Heavy Duty Ceiling Mount for 85" Display
Make/Brand	INTEGRATOR / CUSTOM
Minimum Performance Parameters	

Product Category	Heavy Duty Ceiling Mount to hold 85" Display
Vesa Compatible	600 X 400
Max. Load Carrying Capacity	80Kg

47. Ceiling Mount for Camera

Item Reference	47
Item Description	Ceiling Mount for Camera
Make/Brand	INTEGRATOR / CUSTOM
Minimum Performance Parameters	
Product Category	Ceiling Mount to hold Camera

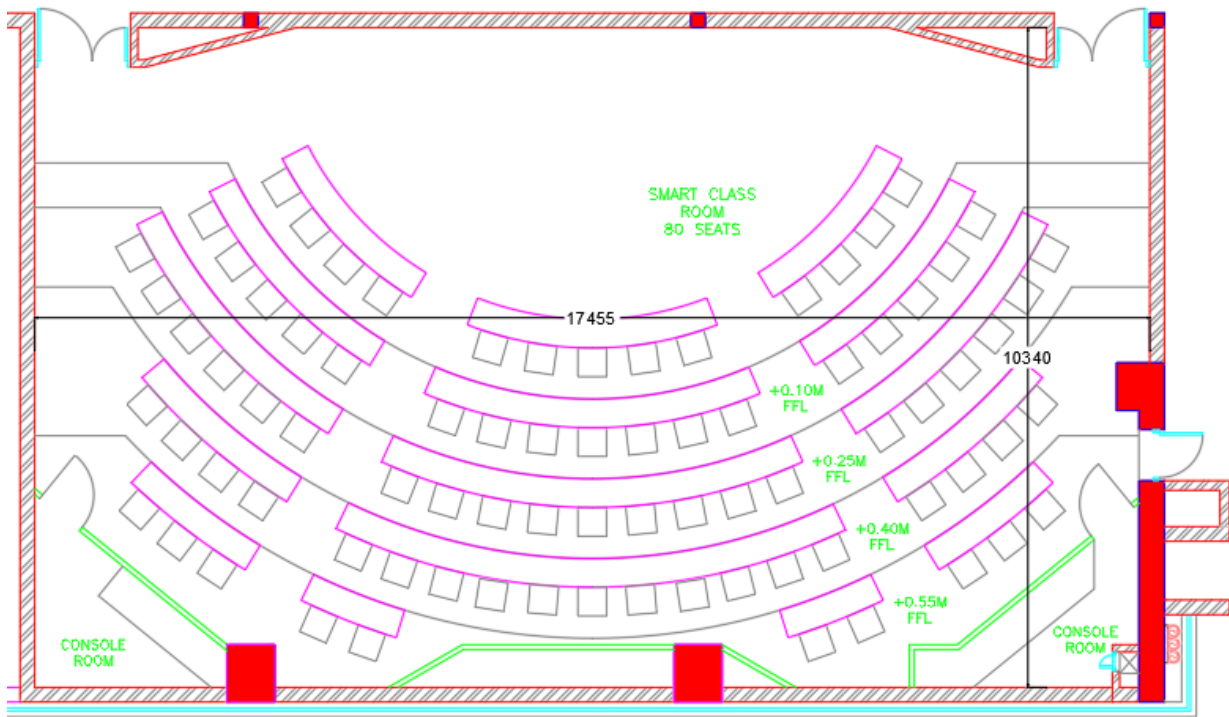
48. Required AV Connectors and long run cable

Item Reference	48
Item Description	Required AV Connectors and long run cable
Make/Brand	NEUTRICK / AMPHENOL
Minimum Performance Parameters	
Required AV Connectors	

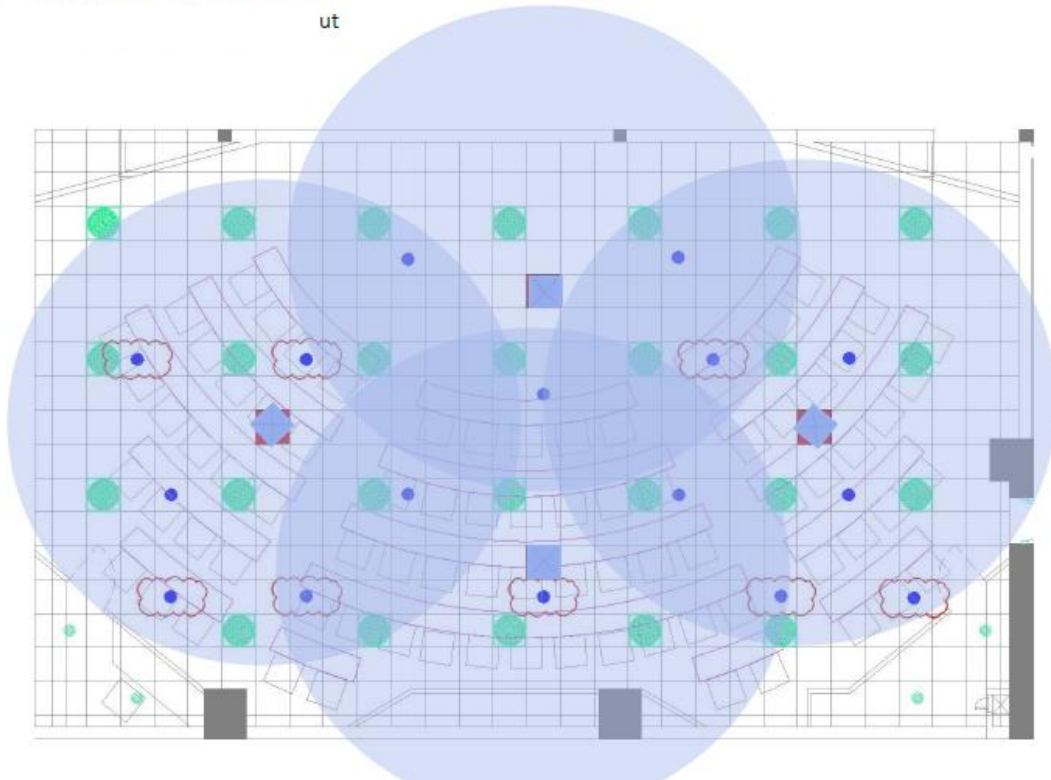
49. Conceptualization, Design Engineering, Supply, Installation & Commissioning, Documentation & One Time User Orientation Charges

Item Reference	49
Item Description	Conceptualization, Design Engineering, Supply, Installation & Commissioning, Documentation & One Time User Orientation Charges
Make/Brand	INTEGRATOR / SERVICES
Minimum Performance Parameters	
Conceptualization, Design Engineering, Supply, Installation & Commissioning, Documentation & One Time User Orientation Charges	

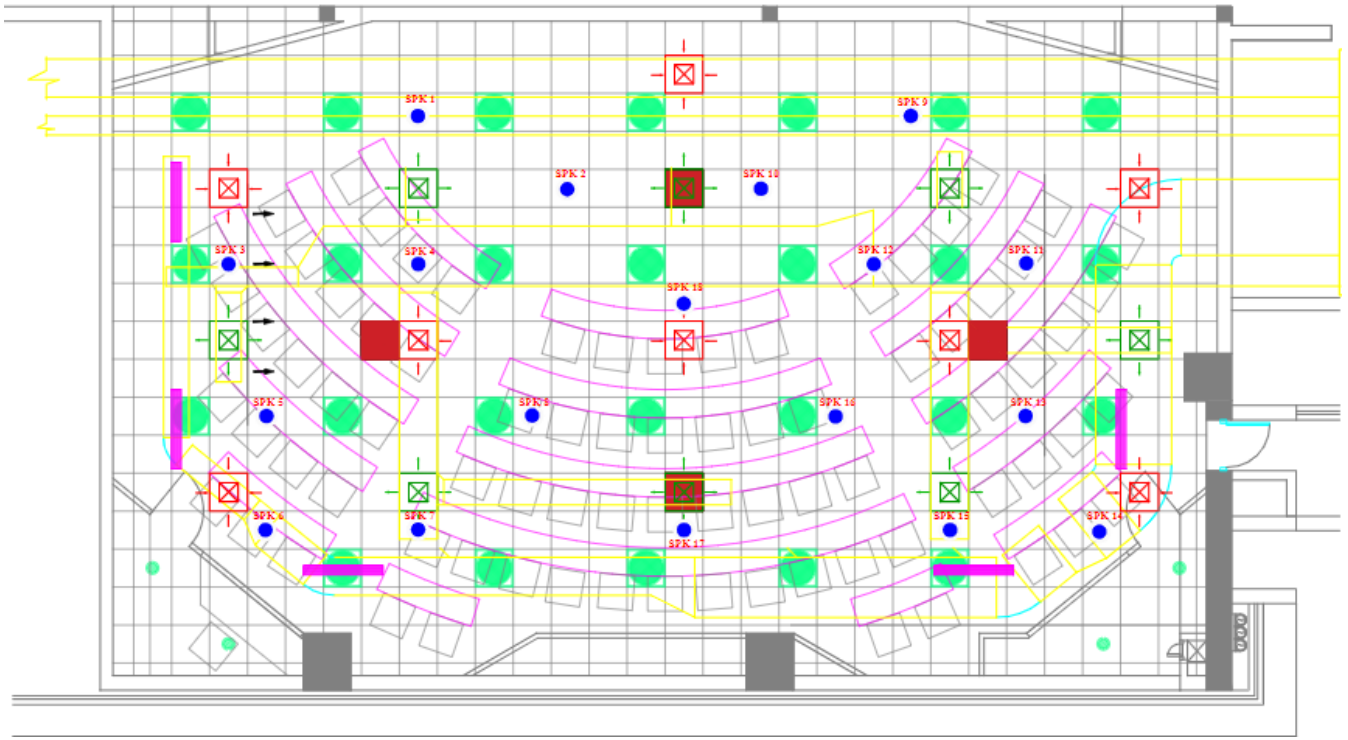
ANNEXURE -2
SMART CLASSROOM DRAWING



MICROPHONE COVERAGE:

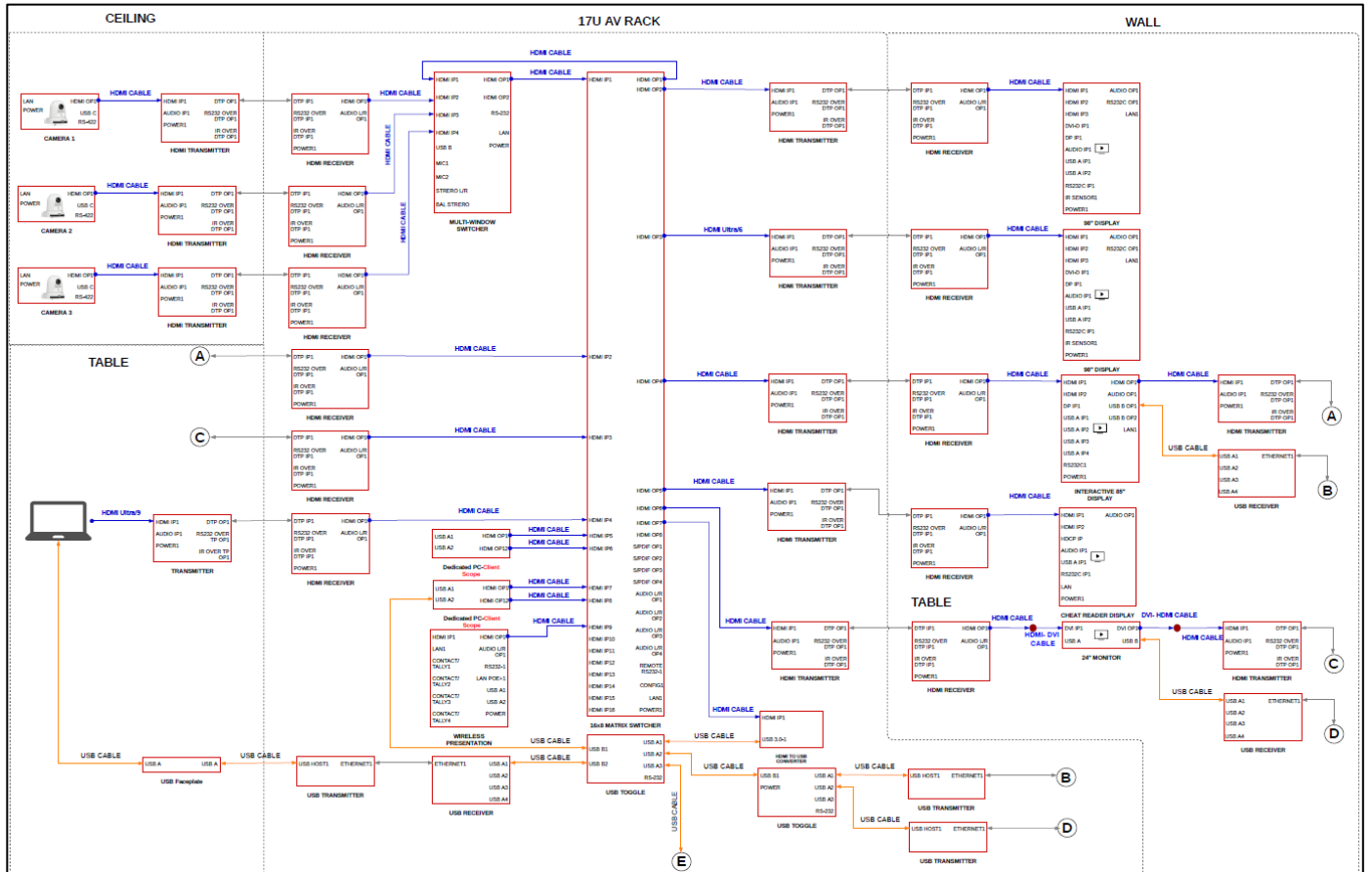


SPEAKER PLACEMENT:

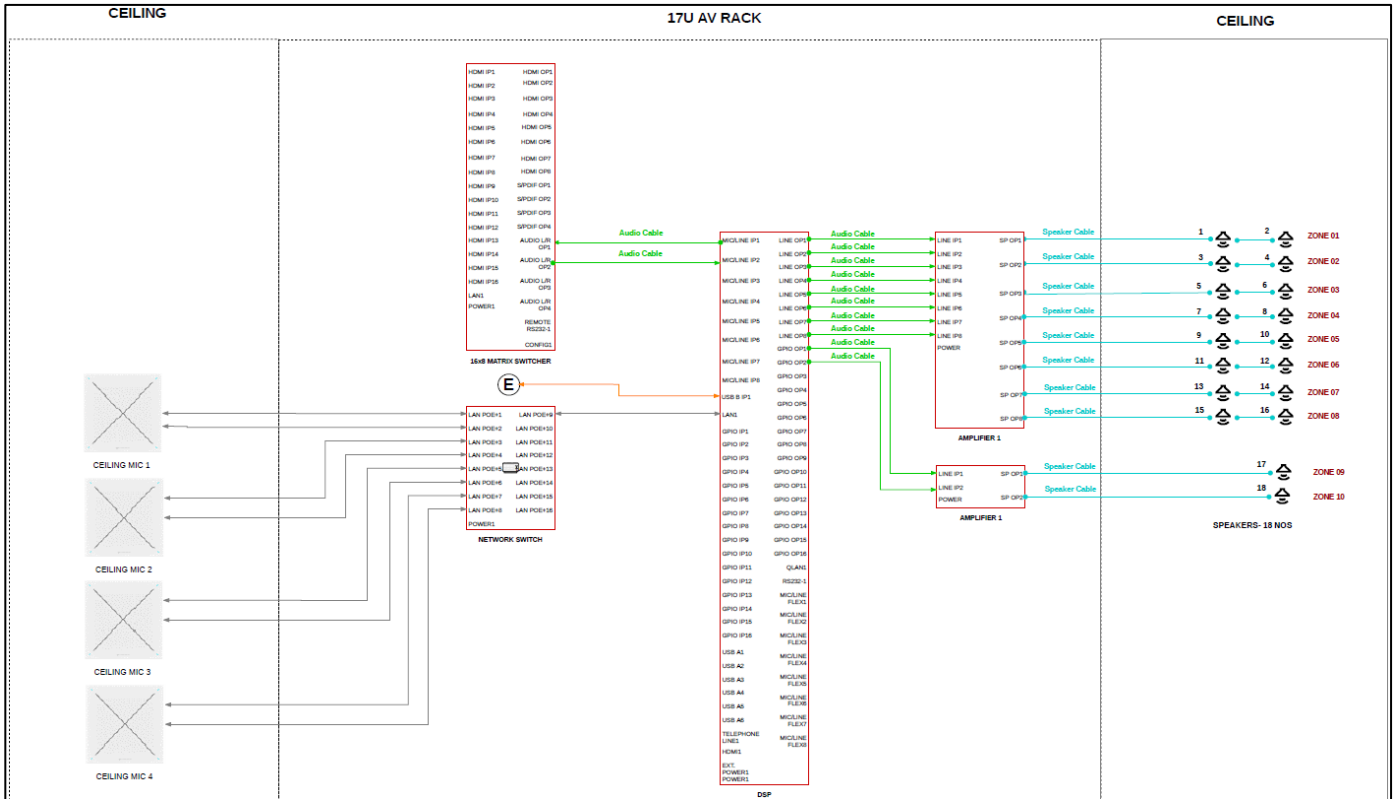


**ANNEXURE –3
AV LINE DRAWING FOR SMART CLASSROOM**

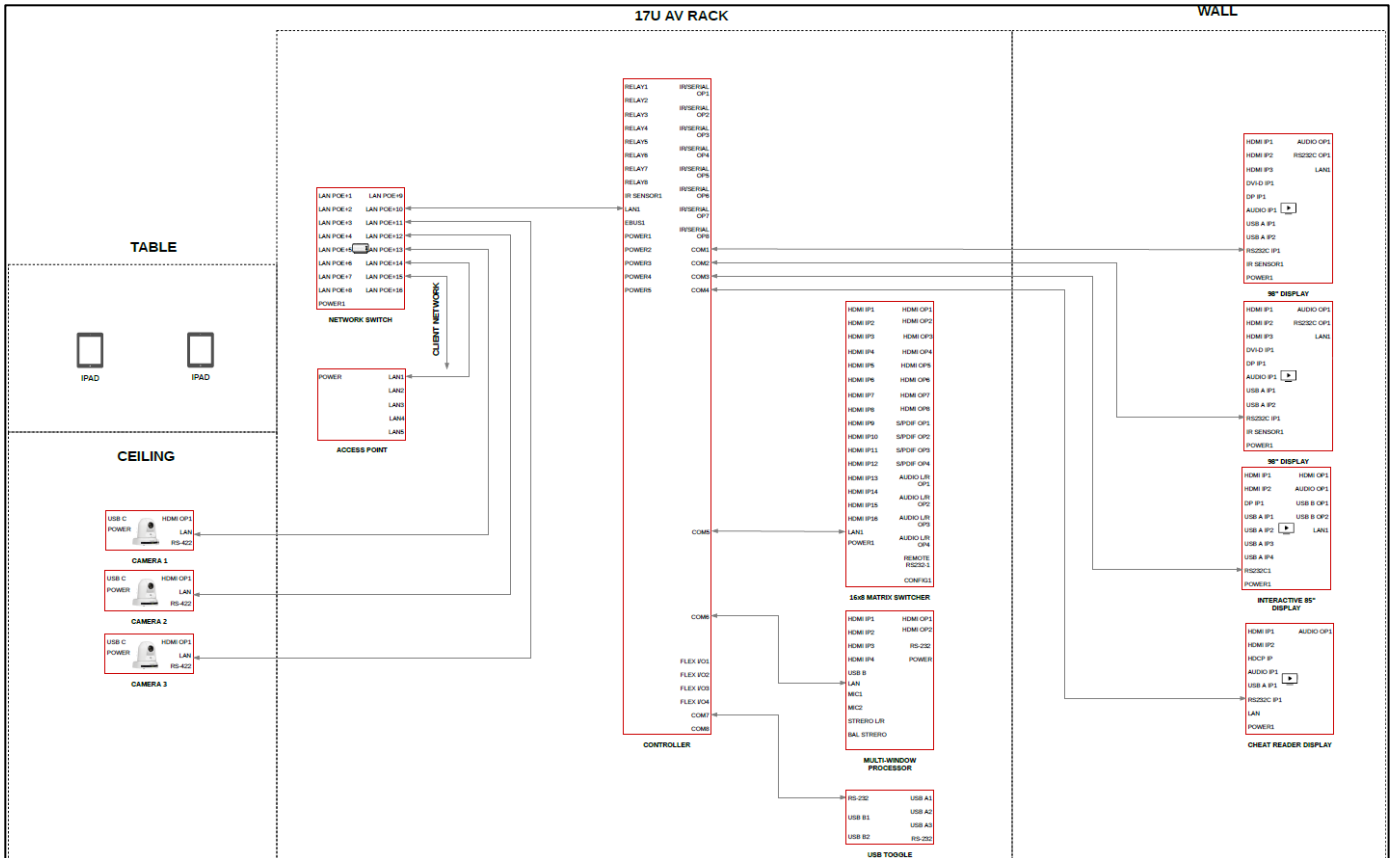
VIDEO SCHEMATIC DIAGRAM:



AUDIO SCHEMATIC DIAGRAM:



CONTROL SCHEMATIC DIAGRAM:



ANNEXURE - 4

**SUPPLY, INSTALLATION AND COMMISSIONING OF AUDIO AND VIDEO
CONFERRING SYSTEM FOR SMART CLASSROOM of IIT MADRAS AS PER DESIGN**

TECHNICAL BID COMPLIANCE STATEMENT
Tender No. CE/RAVI/103/2023/SMARTCLASSAV

(A) PRE-QUALIFICATION CRITERIA

Sl.No.	Description	Compliance (Yes/ No)	Proof with Page No.
I	Bidder Eligibility Criteria I:		
1	Only 'Class-I local suppliers' and 'Class-II local suppliers', as defined under DIPP, MoCI Order No. P-45021/2/2017-PP (BE II) dated 16 th September 2020 and other subsequent orders issued therein, shall be eligible to bid in this tender. Declaration for Class-I and Class-II local suppliers should be submitted in the prescribed proforma format as per Annexure-6		
2	Bidder should confirm their acceptance that they comply with the provisions with report to "Guidelines for eligibility of a bidder from a country which shares a land border with India as detailed at Annexure-7 . Bidder should also submit the required certificates as mentioned.		
II	Bidder Eligibility Criteria II:		
1	The firm should not have been blacklisted / debarred by any Government/ regulatory bodies in India. A self-declaration format given in Annexure – 9		
2	The bidder should submit OEM authorization for the mentioned items Sr# 1 to 4, 6 to 18, 20 and 24 to 27 Make/brand of item for which they are submitting the bid (format is given in Annexure-10).		
3	The bidder should have similar experience in the last 3 years in Govt. Institutions/ any of Central PSU's / any of central Government/ autonomous bodies/reputed firms in executing the following works (any one category). i) Two (2) similar contracts each costing not less than Rs. 50 Lakhs (Or) ii) One (1) similar contract costing not less than Rs. 1 Crore Copies of the documents listed below should be submitted as a proof for the above work experience: a) Purchase Order b) Work Completion Certificates c) User Performance Certificate from End		
4	The bidder shall have an annual financial turnover of not less than Rs. 2 Crores (Rupees Two Crores only) during the last three financial years i.e., 2020-21, 2021-22 and 2022-23 (Financial statements / certificates issued by Chartered Accountant should be submitted as proof).		

TECHNICAL SPECIFICATION SHEET FOR AUDIO AND VIDEO CONFERENCING SYSTEM

1. 98" UHD Display

Item Reference	1	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	98" UHD display		
Make/Brand	SAMSUNG / LG / PANASONIC		
Minimum Performance Parameters			
Panel			
Diagonal Size	98"		
Type	Direct LED		
OS	Tizen 4.0 or Equivalent		
Resolution	3840*2160 (4K UHD)		
Pixel Pitch(mm)	Min. 0.562 x 0.562 (mm)		
Active Display Area(mm)	2158.848(H) x 1214.352(V)		
Brightness(Typ.)	350 nits and above		
Contrast Ratio	1200:1 and above		
Viewing Angle(H/V)	Min 178/178		
Response Time(G-to-G)	8ms (Typ.)		
Display Colors	16.7M		
Color Gamut	0.72		
Panel	Anti-Glare Panel or Equivalent		
Operation Hour	24/7		
Display			
Dynamic C/R	Mega		
H-Scanning Frequency	30 ~ 81kHz		
V-Scanning Frequency	48 ~ 75Hz		
Maximum Pixel Frequency	594MHz		
Input Connectivity			
RGB	DVI-D, Display Port 1.2 (1)		
Video	HDMI 2.0 (2)		
HDCP	HDCP2.2		
Audio	Stereo mini-Jack, DVI, HDMI		
USB	USB 2.0 x 2		
Output Connectivity			
RGB	HDMI 2.0 (Loop-out)		
Audio	Stereo mini-Jack		
External Control	RS232C(in/out) thru stereo jack, RJ45		
External Sensor	IR		

Power			
Power supply	AC 100 - 240 V, 50/60 Hz		
Power consumption	462.0 Max [W/h]		
BTU	1576.41 Max		

2. 85" UHD Interactive Display

Item Reference	2	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	85" UHD Interactive Display		
Make/Brand	SAMSUNG / LG / PANASONIC		
Minimum Performance Parameters			
Panel			
Diagonal Size	85"		
OS	Tizen 6.0 / Equivalent		
Resolution	3840*2160 (4K UHD)		
Brightness(Typ.)	350 nits and above		
Contrast Ratio	1200:1 and above		
Viewing Angle(H/V)	Min 178/178		
Response Time(G-to-G)	Maximum 7ms (Typ.)		
Display Colors	Minimum 16.7M		
Touch			
Type	IR		
# Of Drawing	4 drawing (Internal) 20 touch (External)		
Touch Pen Type	Passive Pen with magnet		
Object Recognition Range	2mm/ 4mm / 8mm / 50mm (Brush Mode : Dynamic Object Recognition)		
Hardness	Heat Semi-Strengthened Glass		
Thickness	3.2T		
Input Connectivity			
Video	HDMI 2(Rear 1, Front 1), DP 1, OPS I/F		
USB	2(For SoC, Rear/Front), 2 (for external 2.0 x1/3.0x1(Front))		
Output Connectivity			
Video	HDMI 1 (Screen Share, Rear)		
Audio	Stereo mini-Jack		
Touch Out	Touch Out 2 (USB Upstream Type, Front 1, Rear 1)		
External Control	Touch Input / RS232C thru stereo jack, RJ45(For MDC)		
Power			
Power supply	AC 100 - 240 V, 50/60 Hz		
Power consumption	418 (OPS 19V/3.7A) Max [W/h]		

BTU	1,425.38 (OPS 19V/3.7A) Max		
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3. 85" UHD Display

Item Reference	3	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	85" UHD display		
Make/Brand	SAMSUNG / LG / PANASONIC		
Minimum Performance Parameters			
Panel			
Diagonal Size	85"		
Type	Direct LED		
OS	Tizen 4.0 / Equivalent		
Resolution	3840*2160 (4K UHD)		
Pixel Pitch(mm)	Max 0.4875 x 0.4875 (mm)		
Active Display Area(mm)	1872(H) x 1053(V)		
Brightness(Typ.)	300 nits or above		
Contrast Ratio	Minimum 4000:1		
Viewing Angle(H/V)	Min 178/178		
Response Time(G-to-G)	Maximum 8ms (Typ.)		
Display Colors	Minimum 16.7M		
Color Gamut	0.72		
Operation Hour	Min. 16/7		
Display			
Dynamic C/R	Mega		
H-Scanning Frequency	30 ~ 81kHz		
V-Scanning Frequency	48 ~ 75Hz		
Maximum Pixel Frequency	594MHz		
Input Connectivity			
Video	HDMI 2.0 (2)		
HDCP	HDCP2.2		
Audio	Stereo Mini Jack, HDMI/Audio(Common)		
USB	USB 2.0 x 1		
Output Connectivity			
Audio	Stereo mini-Jack		
External Control	RS232C(in) thru stereo jack, RJ45		
Power			
Power supply	AC 100 - 240 V, 50/60 Hz		
Power consumption	273.0 Max [W/h]		
BTU	930.9 Max		

4. PTZ Camera

Item Reference	4	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	PTZ Camera		
Make/Brand	PANASONIC / SONY		
Minimum Performance Parameters			
Image Sensors	1/2.5-type 4K MOS x1		
Effective Pixels	Approx. 8,490,000 pixels		
Lens	<ul style="list-style-type: none"> • Motorized Optical 24x zoom, F1.8 to F4.0 • [f=4.12 mm (5/32 inches) to 98.9 mm (3-29/32 inches) • 35 mm (1-3/8 inches) equivalent: 25.0 mm (31/32 inches) to 600.0 mm (23-5/8 inches)] 		
Zoom	Optical zoom: 24x (Min) i.Zoom UHD 28x, FHD 36x Digital extender zoom: 1.4x, 2x (Min)		
Angle of View Range	Horizontal angle of view: Min 74.1° (wide) to 3.3° (tele) Vertical angle of view: Min 46.0° (wide) to 1.9° (tele) Diagonal angle of view: Min 81.8° (wide) to 3.8° (tele)		
Focus	Switching between auto and manual		
Focus Distance	Entire zooming range: Min 1200 mm (3.9 ft) Wide end: Min 100 mm (0.33 ft)		
Minimum Illumination	3 lx (F1.8, 59.94p, 50IRE, 42 dB, without accumulation)		
Horizontal Resolution	UHD: 1,500 Typ (Center area) FHD: 1,000 Typ (Center area)		
Gain Selection	Auto, 0 dB to 36 dB		
Gamma	HD / Normal / Cinema1 / Cinema2 / Still Like		
White Balance	ATW : 3200 K, 5600 K (ATW Speed 3-stage variables) AWB : AWB-A / AWB-B VAR (selectable between 2000 K and 15000 K by designating a value)		
Chroma Amount Variability	OFF, -99 % to 99 %		
Scene File	Full Auto, Scene1, Scene2, Scene3		
Output Format (HDMI)	4K - 2160/29.97p , 2160/25p , 2160/24p , 2160/23.98p HD - 1080/59.94p, 50p, 1080/59.94i, 50i, 1080/29.97p , 25p , 23.98p (over59.94i), 1080/24p , 23.98p , 720/59.94p, 50p		
Video Output (HDMI)	HDMI 1.4 connector 4:2:2/10bit		
Input/Output Connector			
LAN	LAN terminal for IP control (RJ-45)		
RS-422	CONTROL IN RS422A (RJ-45)		
USB	USB2.0 DEVICE, Type C connector, no USB bus-powered function Only compatible with UVC (USB Video Class)UVC 1.0, UAC 1.0		
MIC/LINE input (HDMI/IP)	Φ3.5 mm stereo mini jack		

	<ul style="list-style-type: none"> • MIC input • LINE input 		
Pan-tilt Head Unit			
Installation Method	Stand-alone (Desktop) or suspended (Hanging)		
Pan/tilt Operation Speed	Speed range: 0.08°/s to 60°/s (Normal mode) 3 speed modes installed Normal: 60°/s, Fast1: 90°/s, Fast2: 180°/s		
Panning Range	±175°		
Tilting Range	- 30° to 90°*8		
Quietness	NC25 or less		
IP Streaming			
Image Streaming Mode	JPEG (MJPEG), H.264, H.265, NDI® HX - Up gradable (Optional)		
Image Resolution	1920x1080, 1280x720, 640x360, 320x180		
Image Transmission Setting	JPEG. H.264, H.265		
NDI® Support - Optional (On chargeable basis)			
NDI Support	NDI® HX version 2 : Available to upgrade (chargeable)		
Image Resolution (NDI® HX)	1920x1080, 1280x720		

5. Auto Tracking Software for PTZ Camera

Item Reference	5	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Auto Tracking Software for PTZ Camera		
Make/Brand	PANASONIC / SONY		
Minimum Performance Parameters			
Specification	Software Needs to work with Above mentioned PTZ Camera Facial Recognition and Human Body Detection for Accurate Auto-tracking Detects registered faces even in challenging conditions Auto Zoom Linking a wide-angle camera (AW-SF100 only) One Time License Various settings can be registered as presets for easy operation Works With windows OS		

6. 24" Touch Display

Item Reference	6	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	24" Touch Display		
Make/Brand	WACOM / VIEWSONIC		
Minimum Performance Parameters			
Technology	Electromagnetic Resonance (EMR)		

Screen dimensions	23.8" diagonal (20,7 x 11.75 inches / 527 x 296 mm)		
Native resolution	1920 x 1080 pixels		
Aspect ratio	16:9		
Coordinate Resolution	2540 lpi		
Cover glass surface	Tempered AG etched glass or equivalent		
Report rate	187 points per second		
Pressure levels	Up to 2048		
Video input	DVI-I		
Communication interface	USB 2.0		
Programmable buttons	Min 4		
Response time	16 ms (typical)		
Stand inclination	11° - 73° adjustable stand		
Power supply	AC 100 ~ 240V, 50/60 Hz		
Power consumption	40 W or lower, Power Save mode: 0.5 W or lower, Power OFF mode: 0.5 W or lower		
Supported operating systems	Windows 10 / 8.1 / 7 (32-bit, 64-bit) Mac OSX 10.11 or later		

7. 12.9" iPad

Item Reference	7	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	12.9" iPad		
Make/Brand	APPLE		
Minimum Performance Parameters			
Display	Liquid Retina XDR display & 32.77 cm / 12.9-inch (diagonal) mini-LED backlit Multi Touch display with IPS technology		
Display Resolution	2732x2048-pixel resolution at 264 pixels per inch (ppi)		
Processor Chip	Apple M2 chip 8-core CPU with 4 performance cores and 4 efficiency cores 10-core GPU 16-core Neural Engine 100GB/s memory bandwidth		
Memory	Min 128 GB		
Colour	Space Grey		
Wi-Fi and Cellular	Wi-Fi 6E (802.11ax) with 2x2 MIMO, simultaneous dual band (2.4GHz and 5GHz) Bluetooth 5.3 technology Wi-Fi + Cellular models 5G (sub-6 GHz) with 4x4 MIMO Gigabit LTE with 4x4 MIMO and LAA		
Sensors	Face ID LiDAR Scanner Three-axis gyro Accelerometer Barometer Ambient light sensor		

OS	iPadOS 16		
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8. Wireless Presentation System with Power Injector

Item Reference	8	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Wireless Presentation System with Power Injector		
Make/Brand	EXTRON / AMX		
Minimum Performance Parameters			
Equipment Type	BYOD Wireless Presentation Device for secure collaboration		
Input	1 x HDMI 2.0 or more, 1 x USB or more, 2 x RJ 45 Gigabit Ethernet 10/100/1000 BaseT		
Output	1 x HDMI 2.0 / Display port or better		
Resolution	4K or better		
Features	<ul style="list-style-type: none"> Should have fully customizable welcome screen & Video screen saver & should enable the moderator to select which user can access the display and how the content is displayed. Dual Gigabit Ethernet connections, should have segmentation of internal private networks on one Ethernet from external guest networks on another Ethernet for better Authorisation. Shall a feasibility to add Miracast in future. Shall a feasibility to add live stream decoding from classrooms with same hardware. 		
HDCP & EDID	Should be HDCP2.3 compliant & have EDID management		
Audio Inputs/Outputs	1x embedded audio on HDMI input or better, 1x analog stereo, balanced/unbalanced output		
Simultaneous Display	Full screen or four window Simultaneous display of content from 4 different sources through software app. Wired and wireless sources should be able to collaborate simultaneously		
Data encryption	128-bit, security protocols to ensure that all content transmitted between BYOD devices and this unit is fully encrypted and secure		
Software and control options	Windows, Android & iOS		
Additional Feature	It should enable meeting content to display on a participant's mobile device		
Power options	PoE+ enabled		
Power	High Power Injector with Required Mounting Kit		
Controls	USB, LAN, CEC over HDMI cable or better		

9. 16x8 HDMI Matrix switcher

Item Reference	9	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	16x8 HDMI Matrix switcher		
Make/Brand	EXTRON / AMX / LIGHTWARE		

Minimum Performance Parameters			
Input	Should have Min 16 HDMI or More		
Output	Should have Min 8 HDMI or More with Min 4 De-embedded Analog Audio Output or more		
Video Standards	HDMI 2.0b or better with HDR Support		
Resolution Support	4K/60 @ 4:4:4 or better with minimum 18 Gbps data rate on single port. Shall support Colours up to 10 Bit (Billion Colors)		
Audio Input / Output	Input: Embedded for all HDMI input. Output: Embedded Audio on the HDMI Output Ports and Min 4 De-embedded audio from HDMI Inputs with Volume Control & Audio Breakaway Feature		
HDMI I/O Sensitivity	Automatic input cable equalization & HDMI output regeneration to preserve the reliable HDMI signal extension. HDMI Outputs shall provide Min 250mA Per Port to power the Active Cables if connected to it.		
HDCP & EDID	Should be HDCP2.3 compliant & have inbuilt EDID management		
Ethernet	10/100 Base-T Ethernet for monitoring and control		
Controls	Front panel buttons with indication, Ethernet/RS 232, CEC & USB		
Power Save mode	Should unit be placed in a low power standby state to conserve energy when not in use		
Certification	Should be a JITC certified		
Regulatory compliance	CE, C-tick, c-UL, FCC Class A, ICES, PSE, UL, VCCI, RoHS, and WEEE		

10. HDMI Wallplate Twisted Pair Transmitter

Item Reference	10	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	HDMI Wallplate Twisted Pair Transmitter		
Make/Brand	EXTRON / AMX / LIGHTWARE		
Minimum Performance Parameters			
Video Input	Min 1 x HDMI		
Audio Input	Shall Support HDMI Embedded Audio and shall accept analog stereo audio signals		
Output	1 x CATx on RJ 45 port		
Resolution Support	Min 4K		
Data Rate	Min 10.2 Gbps		
HDCP	Min HDCP 2.3 or better		
Transmission distance	100 Mtr or more over CATx cable		
Audio Output	Transmits analog stereo input over the CATx cable to the receiver		
EDID	Should support EDID pass-through		
Control Input	Min 1 RS232 & 1 IR		
HDCP	HDCP Compliant		
Remote power	Transmitter should support both local power supply and direct powered from receiver		

Certification	Should be a JITC certified		
Compliance	c-UL, UL		
Temperature/humidity	Operating Temp: +32 to +120 °F (0 to +49 °C) or better Operating Humidity : 10% to 90%, noncondensing or better		

11. HDMI Twisted Pair Transmitter

Item Reference	11	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	HDMI Twisted Pair Transmitter		
Make/Brand	EXTRON / AMX / LIGHTWARE		
Minimum Performance Parameters			
Video Input	Minimum 1 HDMI (HDMI 1.4)		
Output	Twisted pair on RJ 45 port		
Resolution Support	4K@30Hz, 8-bit 4:4:4 or better		
Data Rate	Min 10.2 Gbps		
Format Supported	RGB and YCbCr digital video		
Color Bit Depth	Up to 12-bit or better		
Video Standards	HDMI 1.4		
Transmission distance	100 Mtr or more over CATx Cable		
Embedded Audio Support	HD lossless audio format		
Audio Output	Transmits analog stereo input over the TP cable to the receiver		
EDID	Should support EDID pass-through		
Additional Signals	Should extend RS-232 & IR bidirectionally		
HDCP	Min HDCP 2.3 or better		
Power	Transmitter should support both included power supply and remote powering from Matrix		
Installation	Box Type and UL2043 Plenum rated		
Cooling	Convection Cooled and No Vents		
Temperature/humidity	Operating Temp: +32 to +120 °F (0 to +49 °C) or better Operating Humidity : 10% to 90%, noncondensing or better		
CEC	Should support CEC pass-through		
Compliance	CE, c-UL UL, C-tick, FCC Class A**, ICES, VCCI		

12. HDMI Twisted Pair Receiver

Item Reference	12	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	HDMI Twisted Pair Receiver		
Make/Brand	EXTRON / AMX / LIGHTWARE		
Minimum Performance Parameters			
Video Input	Twisted pair on RJ 45 port		

Output	Minimum 1 HDMI (HDMI 1.4)		
Resolution Support	4K@30Hz, 8-bit 4:4:4 or better		
Data Rate	10.2 Gbps or better		
Format Supported	RGB and YCbCr digital video		
Color Bit Depth	Up to 12-bit or better		
Video Standards	HDMI 1.4		
Transmission distance	70 Mtr or more over CATx Cable		
Embedded Audio Support	HD lossless audio format		
Audio Output	Receives analog stereo audio over the TP cable to the receiver		
EDID	Should support EDID pass-through		
Additional Signals	Should extend RS-232 & IR bidirectionally		
HDCP	Min HDCP 2.3 or better		
Power	Receiver should support both local power supply and remote powering from Matrix		
Installation	Box Type and UL2043 Plenum rated		
Cooling	Convection Cooled and No Vents		
Temperature/humidity	Operating Temp: +32 to +120 °F (0 to +49 °C) or better Operating Humidity : 10% to 90%, noncondensing or better		

13. 4K HDMI Seamless Multiview Presentation Matrix Switcher cum Scaler

Item Reference	13	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	4K HDMI Seamless Multiview Presentation Matrix Switcher cum Scaler		
Make/Brand	HALLTECH / EXTRON / KRAMER		
Minimum Performance Parameters			
HDMI Video Inputs	Minimum of 4 x HDMI Video Inputs		
HDMI Video Input Resolution	Minimum up to uncompressed 4K60 4:4:4 (18 Gbps bandwidth, HDMI 2.0 & HDCP 1.4, 2.2)		
HDMI Video Outputs	Minimum of 2 x HDMI Video Outputs		
HDMI Video Output Resolutions	Minimum up to uncompressed 4K60 4:4:4 (18 Gbps bandwidth, HDMI 2.0 & HDCP 1.4, 2.2)		
HDMI Matrix	Minimum of 4x2 Matrix Switching		
Seamless Switching	Seamless Switching with zero blanking frame on both HDMI Outputs		
Multiwindow Layouts	Picture-in-Picture (PIP) on Both HDMI Outputs		
Multiwindow Layouts	Picture-over-Picture (POP) on Both HDMI Outputs		
Customizable Window Layouts	Should support combination of PIP & POP up to minimum of 4 Windows		
Multiwindow Layouts	Selection of Presets from Front Panel, Web GUI & 3rd party Control Systems		
Multiwindow Layouts	Selection Video Inputs of Layout from Front Panel, Web GUI & 3rd party Control Systems		
Multiwindow Layouts	MultiWindow Layout Output directly onto USB 3.0 interface (Capture card)		
Recording	Should support Record and Save to USB2.0 port		

	connected with external storage device		
Audio Input	Balanced / Un-Balanced Audio Input usable for Microphone / Content		
Microphone Input	Balanced Mic Input with 48V Phantom and line level audio support		
Audio Output	Un-Balanced / Balanced stereo 5-pin Phoenix connector		
Audio Mixer Capability	Mixer Output directly into a single USB 3.0 interface & also Audio Output Connectors		
	HDMI Content / Microphone Mixing capability & provided mixing on to Video Output on USB / HDMI		
	Both Audio Embedding & De-Embedding on HDMI, Balanced & Un-Balanced Connectors		
Control Interface Protocols	1) IR 2) RS-232 3) Telenet / TCP-IP LAN 4) Web GUI		
Button functionality	Front / Top Keypad for Multiview Layout Selection		
	Front / Top Keypad for Audio Controls (Mic & Program)		

14. USB Twisted Pair Extender (Transmitter & Receiver)

Item Reference	14	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	USB Twisted Pair Extender (Transmitter & Receiver)		
Make/Brand	EXTRON / AMX / GEFEN		
Minimum Performance Parameters			
USB Host port	Min 1 USB type-B female port		
USB peripheral hub	Min 4 USB Type- A female ports hub		
USB support	Shall support USB 2.0, 1.1, or 1.0 peripherals and USB 3.0 peripherals that can operate at USB 2.0 rates		
USB data rates	Shall support Low speed (1.5 Mbps), full speed (12 Mbps), high speed (480 Mbps)		
Output Voltage	5 Volts, 500 mA on each port or equivalent		
Peripheral emulation	Should have Peripheral emulation for a continuous connection between the host and an HID-compliant keyboard and mouse		
Distance	Should Extend USB peripherals up to 330 feet (100 meters) point-to-point over one CATx cable or 1,980 feet (600 meters) through a Gigabit Ethernet network		
Control	Should provide a front panel button in both transmitter and receiver to pair up the transmitter and receiver manually if required		
Additional Features	Same Hardware should be capable to be upgraded to a USB Matrix Switcher with additional Hardware/Software		
Regularity Compliance	CE, C-Tick, c-UL, FCC Class A, ICES, VCCI		

15. USB3.0 Host Switcher

Item Reference	15	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	USB3.0 Host Switcher		
Make/Brand	INOGENI / EXTRON		
Minimum Performance Parameters			
USB Device / Pheripheral Ports	Minimum of 3 x USB 3.0 Pheripheral Ports		
Compatibility of Pheripheral Ports	Both USB 2.0 & USB 3.0 formats (Minimum of 5 Gbps)		
Host Ports	Minimum of 2 x USB 3.0 Host Ports (connectivity of up to 2 PCs)		
Compatibility of Host Ports	Both USB 2.0 & USB 3.0 formats (Minimum of 5 Gbps)		
Modes of Operation	a) Automatic Mode b) Manual Mode c) Remote control (RS-232 control & GPI control)		
Automatic Mode	This mode Should switch automatically to the last PC1 connected. If the current PC is disconnected, the device will switch back to the other PC if it is detected. Push-button action and remote control are also supported.		
Manual Mode	The manual mode will enable you to force a specific PC selection. Push-button action and remote control are also supported. It is possible to turn OFF both PCs in manual mode.		
Remote Control (Serial)	3.5 mm captive screw connector, 3 pole (RS-232) with Valid Serial Protocols & Settings for control from 3rd party Control Systems		
Remote Control (GPIN)	Should allow Contact-closure control. Should be Controlled by open-drain IO (short to ground) or driven IO. Should Support voltage range: 0V to +12V max & with Voltage threshold up to 2.3V.		
Power Source	External power supply can provide power to the USB 3.0 devices (1.8A shared current limit) or equivalent		
USB3.0 Compatibility with Software / OS	USB3.0 Compatibility with Software / OS		
USB3.0 Compatibility with Software / Drivers	Plug & Play for without any need to install any Drivers & no need of major Setup		

16. HDMI & Audio USB Bridge

Item Reference	16	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	HDMI & Audio USB Bridge		
Make/Brand	INOGENI / EXTRON / EIPHAN		
Minimum Performance Parameters			
HDMI Video Input	Minimum of 1 x HDMI Video Camera / Content Input		
HDMI Input Video Resolution Support	Ultra HD 4K (3840/4096x2160) at 30 fps, 1440p, 1080p at 60fps, 1080i, 720p, 480p, and 576p		
HDMI Input Graphic Resolution Support	1920x1200, 1280x1024, 1280x960, 1024x768, 800x600, 640x480		
Video Outputs	Min HDMI x 1no		

Video Outputs	Min USB3.0 x1no Type C		
Power Source	Should be powered on USB C		
Audio Input	Un-Balanced Audio Input usable for Microphone / Content		
Audio De-Embedder	Mixed Audio (as per Mixer Functionality) HDMI / USB Video Source Audio De-Embedding		
Audio Mixing & Output	Content / Camera / Microphone Mixing capability & provided mixing on to Video Output on USB / HDMI.		
Visca Port	PTZ control for camera thru Zoom or similar UC software.		
Digital Fluid technology	For support of Internal frame buffers maximize frame rate with any PC		
Colour Space & Sampling Conversion	Hardware-based Colour space and sampling conversion		
Scaling and Frame rate conversion	Automatic scaling and frame rate conversion & not required to be supporting UHD up-scaling (can be added advantage to have up-scaling)		
Customizable video processing functions Image controls like	Brightness, contrast, saturation and Hue settings. These controls should work on all formats below 4K (not required to be on 4K Video format)		
USB3.0 Compatibility with Software / OS	Compatible with Windows 8 or above , Mac OS X and Linux		
USB3.0 Compatibility with Software / Drivers	Plug & Play for without any need to install any Drivers & no need of major Setup		

17. 5Gbps 4 Port SuperSpeed USB 3.0 Hub

Item Reference	17	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	5Gbps 4 Port SuperSpeed USB 3.0 Hub		
Make/Brand	STARTECH / AMKETTE		
Minimum Performance Parameters			
Interface	Min USB 3.2 Gen 1 (5Gbps)		
External Ports	4 - USB Type-A (9 pin, 5 Gbps) 1 - USB 3.2 Type-B (9 pin, Gen 1, 5Gbps)		
LED Indicators	1 - Power (Blue)		
OS Compatibility	OS Independent; No additional drivers or software required		
Total USB Power Output	10W		
Maximum Data Transfer Rate	Min 5 Gbps (USB 3.2 Gen 1)		
MTBF	24,000 Hours		
Power	Power Source - AC Adapter Included Input Voltage - 100 - 240 AC Input Current - 0.35A Output Voltage - 5 DC Output Current - 2A Center Tip Polarity - Positive Plug Type - M Power Consumption (In Watts) - 10		

18. Ceiling Tile Microphone with Voice lift

Item Reference	18	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Ceiling Microphone with Voicelift		
Make/Brand	SENNHEISER / SHURE / CLEARONE		
Minimum Performance Parameters			
Connections and Operating Elements	Dante : Dante™ interface with two RJ 45 or similar sockets : Primary and Secondary Reset : Factory reset switch or equivalent Analog Out : 3-pin terminal for analog audio out or equivalent Ethernet : RJ 45 socket for network control		
Pick-up pattern	Beam pattern or equivalent		
Specification	<ul style="list-style-type: none"> • The microphone array shall fit within the space of a standard 650 Sq Ft • The microphone array shall consist of minimum 28 pre-polarized condenser microphone capsules and shall use beamforming technology that automatically focuses on whoever is speaking in the room • The beam will automatically detect the position of the person speaking and will follow the person around the room at all times • A threshold for the detection shall be adjustable • Live monitoring of the horizontal and vertical angle of the position shall be available in the software • The microphone array shall have a Dante™ interface with two RJ 45 sockets (Primary and Secondary) for digital audio output, supporting both redundant and daisy-chain modes • The microphone array shall also feature a 3-pin terminal for analog audio output, which is compatible with Phoenix contact MCVW 1.5-3-ST-3.81 connectors • In addition, the microphone array shall have an RJ 45 Ethernet socket for network control and easy configuration and monitoring using the control software • The RJ 45 Ethernet socket shall also support Power over Ethernet, using the PoE IEEE 802.3af Class 3 standard • Supply, installation, testing & commissioning of ceiling microphone shall be designed for fixed installation in medium to large conference rooms 		

19. 16 Port Unmanaged POE+ Switch

Item Reference	19	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender
Item Description	16 Port Unmanaged POE+ Switch		
Make/Brand	NETGEAR / TP LINK / D-LINK		

			document
Minimum Performance Parameters			
Number of Ports	Min 16 Gigabit Ports		
PoE Budget	183W or equivalent		
PoE Ports / Max power outlet	16 PoE+ ports, up to 30W per port		
Mean Time Between Failures (MTBF)	2,088,514 hours		
Energy Efficient Ethernet support	Yes		
Jumbo frame support	Yes		
Packet buffer size	1MB		
PoE Auto balance	Yes		
Power Supply	External - Input 54V 3.7A (200W)		

20. Digital Signal Processor

Item Reference	20	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Digital Signal Processor		
Make/Brand	QSC / BIAMP / SYMETRIX		
Minimum Performance Parameters			
Specification	<ul style="list-style-type: none"> Supply, Installation, Testing & Commissioning of 24 Channel Audio & Control processor with minimum 16 mic/line inputs & 8 line level audio outputs, minimum 16 channels of AEC The processor shall have minimum 8x8 Dante channels and shall also support up to 128x128 Network audio channels via Dante or AES67 It shall also support POTS and SIP Softphone integration for Audio conferencing and configurable 16x16 USB Audio channels via USB-B ports supporting AV USB Bridging for software or web-based conferencing applications The processor shall also have minimum 24 bit-A/D-D/A converters, 48 kHz Sample rate, Input frequency response of 20 Hz to 20 kHz @ +21dBu, Input dynamic range > 109.5 dB at @ +24 dBu sensitivity 		

21. UCI Deployment Software License for DSP

Item Reference	21	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	UCI Deployment Software License for DSP		
Make/Brand	QSC / BIAMP / SYMETRIX		
Minimum Performance Parameters			
Specification	Supply, Installation, Testing & Commissioning of Perpetual License to support third party device control via Ethernet, RS232 and GPIO		

22. Scripting Engine Software License for DSP

Item Reference	22	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Scripting Engine Software License for DSP		
Make/Brand	QSC / BIAMP / SYMETRIX		
Minimum Performance Parameters			
Specification	<ul style="list-style-type: none"> Supply, Installation, Testing & Commissioning of Perpetual License to enable touch screen controller features in the processor It should be perpetual and have capability to connect any number of touch screen controllers including iOS/windows based touch screens 		

23. Software DANTE License for DSP

Item Reference	23	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Software DANTE License for DSP		
Make/Brand	QSC / BIAMP / SYMETRIX		
Minimum Performance Parameters			
Specification	Supply, Installation, Testing & Commissioning of Perpetual License to enable 16x16 channels of Dante in the above specified processor		

24. Two Channel Amplifier

Item Reference	24	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Two Channel Amplifier		
Make/Brand	QSC / LABGRUPPEN / POWERSOFT		
Minimum Performance Parameters			
Specification	<ul style="list-style-type: none"> Supply, Installation, Testing & Commissioning of 2 Channel Class D amplifier Power 200W @8Ω/4Ω/70V/100V.Flexible power sharing between a pair of channels Frequency Response at 8 Ω - 20 Hz – 20 kHz +/- 0.5 dB. User-configurable operating modes (per channel):- DIP switch selectable, low impedance 4 Ω or 8 Ω,high impedance direct drive 70 V or 100 V modes (per channel),Selectable 80 Hz highpass filter offered on each channel Front panel indicators:- Power, signal (per channel), limit / mute / protect (per channel) Rear panel indicators:- Bi-Color LED signal / limit/ mute/ protect, Forced air cooling, thermally regulated fan speed, Remote standby, amplifier status enunciation on 3.5 		

	mm connectors, Power saving features - Auto-standby		
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25. Eight Channel Amplifier

Item Reference	25	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Eight Channel Amplifier		
Make/Brand	QSC / LABGRUPPEN / POWERSOFT		
Minimum Performance Parameters			
Specification	<ul style="list-style-type: none"> Supply, Installation, Testing & Commissioning of 8 Channel Class D amplifier Power 200W per channel @8Ω/4Ω/70V/100V Each pair of amplifier channels can deliver up to 400 W total power, in any ratio Frequency Response at 8 Ω - 20 Hz – 20 kHz +/- 0.5 dBz. Signal to Noise ratio -> 103 dB, Input impedance - >10k, balanced or unbalanced User-configurable operating modes (per channel):- DIP switch selectable, low impedance 4 Ω or 8 Ω,high impedance direct drive 70 V or 100 V modes (per channel),Selectable 80 Hz highpass filter on each channel Front panel indicators:- Power, signal (per channel), limit / mute / protect (per channel) Rear panel indicators:- Bi-Color LED signal / limit/ mute/ protect, Forced air cooling, thermally regulated fan speed, Remote standby, Power saving features - Auto-standby Size-1RU 		

26. Ceiling Speaker

Item Reference	26	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Ceiling Speaker		
Make/Brand	QSC / TANNOY / MAYER SOUND		
Minimum Performance Parameters			
Specification	<ul style="list-style-type: none"> Supply, Installation, Testing & Commissioning of 2-way, Ceiling-mount loudspeaker Frequency range - 52 Hz to 20 kHz, Rated RMS Power - 80Watts or better, Sensitivity- 89 dB SPL or better, Coverage Angle (-6 dB)- 100° conical or better, Maximum SPL Continuous/Peak-108dB/114dB or better, Rated Impedance - 8 Ohms Transformer Tapping - 70V/100V(60, 30, 15, 7.5watts) or better Transducer - LF - 8-inch or better, HF- .86-inch or better coaxially mounted with LF, Material - Painted ABS polymer Baffle and 		

	<p>painted steel grille or better</p> <ul style="list-style-type: none"> • Safety rating - UL1480, UL2043 • Mounting rails and C-Ring for ceiling tile included 		
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27. AV Controller

Item Reference	27	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	AV Controller		
Make/Brand	EXTRON / AMX		
Minimum Performance Parameters			
Memory	Min 512MB SDRAM, 4GB Flash or better		
Interfaces	<ul style="list-style-type: none"> • Minimum 8 x RS-232 bidirectional / two way (acceptable with additional modules) • Minimum 1x RJ-45 for Ethernet controllable devices, Control of minimum 40 Ethernet Devices or better • 8 or more x IR/Serial • 8 or more x Relay ports • Others: Programming, Digital I/O • 4 independently switched 12 VDC outputs 		
IR Learner	Inbuilt or supplied with external IR learner		
IP Addressing	DHCP Server inbuilt to automatically assign IP address to AV devices connected		
Security	Supports Secure protocols HTTPS, SSH, SFTP, SMTP while communicating with other devices in network		
Software	Should have an own configuration/GUI development software to configure AV devices (Free Downloadable from supplied OEM's website)		
Protocols	DHCP, DNS, HTTP (redirect), HTTPS, ICMP, IEEE 802.1X, NTP, SFTP, SMTP, SNMP, SSH, TCP/IP, UDP/IP		
Certification	Should be a JITC certified		
Regulatory compliance	CE, C-Tick, c-UL, FCC Class A, ICES, UL, VCCI		
Temperature/humidity	Operating Temp : +32 to +120 °F (0 to +49 °C) or better Operating Humidity : 10% to 90%, noncondensing or Better		

28. 10.2" iPad

Item Reference	28	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	10.2" iPad		
Make/Brand	APPLE		
Minimum Performance Parameters			
Display	10.2 inch (diagonal) LED-backlit Multi-Touch display with IPS Technology		
Display Resolution	2160 x 1620 pixels		
Processor Chip	A13 Bionic chip with 64-bit architecture Neural Engine		

Memory	Min 64 GB		
Colour	Space Grey		
Wi-Fi	IEEE 802.11a/b/g/n/ac		
Bluetooth	Min Bluetooth 4.2		
OS	iPadOS 15		

29. Wi-Fi Access Point

Item Reference	29	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Wi-Fi Access Point		
Make/Brand	TP LINK / CISCO / D-LINK		
Minimum Performance Parameters			
HARDWARE FEATURES			
Interface	4 × 10/100Mbps LAN Ports 1 × 10/100Mbps WAN Port		
Button	WPS/Reset Button Wireless On/Off Switch Power On/Off Button		
External Power Supply	12VDC/1A or equivalent		
Antenna	3 × 2.4GHz Antennas 2 × 5GHz Antennas		
WIRELESS FEATURES			
Wireless Standards	IEEE 802.11ac/n/a 5GHz IEEE 802.11b/g/n 2.4GHz		
Wireless Speeds	Min 450Mbps(2.4GHz) Min 867Mbps(5GHz)		
Frequency	2.4-2.5GHz 5.15-5.25GHz		
Transmit Power	≤20dBm (2.4GHz) ≤23dBm (5GHz)		
Wireless Modes	Wireless Router WDS(Four Address) WDS(AP+APC)		
Wireless Security	WEP WPA\WPA2 WPA-PSK\WPA2-PSK		
OTHER FEATURES			
Operating System	Microsoft Windows XP/Vista/7/8/8.1/10 MAC OS, NetWare, UNIX or Linux		
Environment	Operating Temperature: 0°C~40 °C (32 °F~104°F) Storage Temperature: -40°C~70 °C (-40 °F~158°F) Operating Humidity: 10%~90% non-condensing Storage Humidity: 5%~90% non-condensing		
Certification	CE, RoHS		

30. USB Faceplate

Item Reference	30	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in
Item Description	USB Faceplate		
Make/Brand	INTEGRATOR / CUSTOM		

			the tender document
Minimum Performance Parameters			
HARDWARE FEATURES			
Input	USB2.0 Type A (Female)		
Output	USB2.0 Type A (Female)		

31. 6 Feet HDMI Male to Male Cable

Item Reference	31	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	6 Feet HDMI Male to Male Cable		
Make/Brand	EXTRON / KRAMER		
Minimum Performance Parameters			
Resolution range	Up to 4K @ 60 Hz (4096x2160), UHD @ 60 Hz (3840x2160) 8 bit color depth, max. 18.0 Gbps data rate		
Connector type	1 male type A HDMI to 1 male type A HDMI		
Contacts	Gold plated		
Material	Conductors: tinned copper, 28 AWG Drain wire: tinned copper, 28 AWG Shielding: fluorocopolymer tape binder, tinned copper braid Jacket: PVC		
Features	<ul style="list-style-type: none"> • Ultra-flexible HDMI cables • Conforms to Premium High Speed HDMI cable performance standards • 4K/60 verified • Supports ARC and CEC • Gold-plated contacts 		

32. 9 Feet HDMI Male to Male Cable

Item Reference	32	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	9 Feet HDMI Male to Male Cable		
Make/Brand	EXTRON / KRAMER		
Minimum Performance Parameters			
Resolution range	Up to 4K @ 60 Hz (4096x2160), UHD @ 60 Hz (3840x2160) 8 bit color depth, max. 18.0 Gbps data rate		
Connector type	1 male type A HDMI to 1 male type A HDMI		
Contacts	Gold plated		
Material	Conductors: tinned copper, 28 AWG Drain wire: tinned copper, 28 AWG Shielding: fluorocopolymer tape binder, tinned copper braid Jacket: PVC		
Features	<ul style="list-style-type: none"> • Ultra-flexible HDMI cables • Conforms to Premium High Speed HDMI cable performance standards • 4K/60 verified • Supports ARC and CEC 		

	<ul style="list-style-type: none"> • Gold-plated contacts 		
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33. 6 Feet USB 3.0 Type A Male to Type B Male Cable

Item Reference	33	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	6 Feet USB 3.0 Type A Male to Type B Male Cable		
Make/Brand	KRAMER / STARTECH / EXTRON		
Minimum Performance Parameters			
Max Data Rate	4.8 Gbps		
Connector type	USB 3.0 SuperSpeed Type A Male to Type B Male		
Connector Plating	Nickel		
Conductors	28/24AWG		
Outer sheath color	Blue		
Compatible	USB Specifications 1.0, 1.1 and 2.0		
Features	Foil & Overall Braid Provide Maximum Protection Against EMI/RFI Molded Strain Relief & RoHS Compliant		

34. 6 Feet USB 2.0 Type A Male to Type B Male Cable

Item Reference	34	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	6 Feet USB 2.0 Type A Male to Type B Male Cable		
Make/Brand	KRAMER / STARTECH / EXTRON		
Minimum Performance Parameters			
Max Data Rate	480Mbps		
Connector type	USB2.0 High Speed Type A Male to Type B Male		
Connector Plating	Nickel		
Conductors	28AWG		
Outer sheath color	Gray		
Compatible	USB Specifications 1.0 & 1.1		
Features	Foil & Overall Braid Provide Maximum Protection Against EMI/RFI Molded Strain Relief RoHS Compliant		

35. 10 Feet USB 2.0 Type A Male to Type B Male Cable

Item Reference	35	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	10 Feet USB 2.0 Type A Male to Type B Male Cable		
Make/Brand	KRAMER / STARTECH / EXTRON		
Minimum Performance Parameters			
Max Data Rate	480Mbps		
Connector type	USB2.0 High Speed Type A Male to Type B Male		

Connector Plating	Nickel		
Conductors	28/24AWG		
Outer sheath color	Gray		
Compatible	USB Specifications 1.0 & 1.1		
Features	Foil & Overall Braid Provide Maximum Protection Against EMI/RFI Molded Strain Relief RoHS Compliant		

36. 10 Feet USB 2.0 Type A Male to Type A Male Cable

Item Reference	36	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	10 Feet USB 2.0 Type A Male to Type A Male Cable		
Make/Brand	KRAMER / STARTECH / EXTRON		
Minimum Performance Parameters			
Max Data Rate	480Mbps		
Connector type	USB2.0 High Speed Type A Male to Type A Male		
Connector Plating	Nickel		
Conductors	28/24AWG		
Outer sheath color	Gray		
Compatible	USB Specifications 1.0 & 1.1		
Features	Foil & Overall Braid Provide Maximum Protection Against EMI/RFI Molded Strain Relief RoHS Compliant		

37. DGKat / HDBaseT / LAN Cable

Item Reference	37	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	DGKat / HDBaseT / LAN Cable		
Make/Brand	KRAMER / EXTRON		
Minimum Performance Parameters			
Conductors	Size: 4x2x23AWG Material: Annealed copper Diameter: 0.56mm ±0.01mm		
INSULATION	Material: Skin/Foam/Skin HDPE Diameter: 1.33mm ±0.10mm Color Code: White/Blue, White/Orange, White/Green, White/Brown		
SCREENING	Material: Alu/PET per pair (Alu side out)		
DRAIN WIRE	Material: Tinned copper Diameter: 0.4mm ±0.01mm		
JACKET	Material: LSHF Color: Blue RAL 5012 Thickness: ≥0.5mm Diameter: 7.2mm ±0.2mm Page 25 of 59		
ELECTRICAL	Impedance: 1–100MHz: 100Ω ±15Ω, 100–250MHz: 100Ω ±20Ω, 250–500MHz:		

	100Ω ±25Ω Propagation Velocity (NVP): 76% Voltage Rating: 60V Delay Skew: <45ns Mutual Pair Capacitance: ≤42pF/m Capacitance Unbalance Pair/ground: ≤1500pF/km Conductor DC Resistance: <79.8Ω/km Pair Resistance Unbalance DC: <1.5% Dielectric Strength: 2.5kV DC (2s) Insulation Resistance (500V): >5000MΩ/km		
USAGE AND ENVIRONMENTAL	Storage / Transport / Installation Temperature: 0°C to +50°C Operation Temperature: 0°C to +60°C		
MECHANICAL	Maximum Pulling Tension: : 100N Bending Radius - Installed: 50mm Bending Radius - During Installation: 60mm		
STANDARDS COMPLIANCE - EC VERIFIED	Electrical: EIA/TIA 568A, ISO/IEC 11801 Fire Performance: IEC 60332-1 Smoke Density: IEC 61034 Halogen Free: IEC 60754 RoHS: 2011/65/EU		
STANDARDS COMPLIANCE	Reaction to Fire Classification: Dca-s2,d1,a1		

38. RJ45 Connector

Item Reference	38	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	RJ45 Connector		
Make/Brand	KRAMER / EXTRON		
Minimum Performance Parameters			
Specification	Designed for 24AWG to 23AWG twisted pair cables with overall cable insulation diameter — 1.40mm to 1.50mm		

39. Twisted pair cable for control

Item Reference	39	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Twisted pair cable for control		
Make/Brand	COMMSCOPE / KRAMER		
Minimum Performance Parameters			
Type	Twisted pair cable - U/UTP (unshielded)		
Conductors, quantity	8		
Separator Type	Isolator / Bisector		
Conductor Gauge, singles	24 AWG or better		
Conductor Material	Bare copper or equivalent		
Insulation Material	Polyolefin or equivalent		

40. Serial Control / Audio Cable

Item Reference	40	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Serial Control / Audio Cable		
Make/Brand	EXTRON / AMX / BELDEN		
Minimum Performance Parameters			
Type	2-core shielded, 22 AWG high- performance, tinned coper conductor		
AWG	22 AWG or better		
Length	As per requirement		

41. Speaker Cable

Item Reference	41	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Speaker Cable		
Make/Brand	EXTRON / AMX / BELDEN		
Minimum Performance Parameters			
Type	Pair of Bare Stranded Copper Cable		
AWG	18 AWG or better		
Length	As per requirement		

42. DVI-D Male to HDMI Female Adapter Cable

Item Reference	42	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	DVI-D Male to HDMI Female Adapter Cable		
Make/Brand	KRAMER / STARTECH		
Minimum Performance Parameters			
Cable Type	One End : DVI-D Male Port Other End : HDMI Female Port		
Cable Length	1ft (0.3m)		
Feature	Designed to adapt an HDMI cable to a device with a DVI input, or to adapt a DVI source to an HDMI cable		

43. AV Rack

Item Reference	43	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	AV Rack		
Make/Brand	VALRACK / VERO PRESIDENT		
Minimum Performance Parameters			
17U AV Rack	Depth – 650mm Power Distribution Unit Vertical – 2Nos Rack Shelf – 6Nos 1U Blank Spacer – 4Nos Rack Equipment Cooling Fan – 1 Set Castor Wheels with Lock – 2 Set		

44. Heavy Duty Wall Mount for 98" Display

Item Reference	44	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Heavy Duty Wall Mount for 98" Display		
Make/Brand	INTEGRATOR / CUSTOM		
Minimum Performance Parameters			
Product Category	Heavy Duty Wall Mount to hold 98" Display		
Vesa Compatible	800 X 400		
Max. Load Carrying Capacity	110Kg		

45. Heavy Duty Wall Mount for 85" Interactive Display

Item Reference	45	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Heavy Duty Wall Mount for 85" Interactive Display		
Make/Brand	INTEGRATOR / CUSTOM		
Minimum Performance Parameters			
Product Category	Heavy Duty Wall Mount to hold 85" Interactive Display		
Vesa Compatible	600 X 400		
Max. Load Carrying Capacity	100Kg		

46. Heavy Duty Ceiling Mount for 85" Display

Item Reference	46	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Heavy Duty Ceiling Mount for 85" Display		
Make/Brand	INTEGRATOR / CUSTOM		
Minimum Performance Parameters			
Product Category	Heavy Duty Ceiling Mount to hold 85" Display		
Vesa Compatible	600 X 400		
Max. Load Carrying Capacity	80Kg		

47. Ceiling Mount for Camera

Item Reference	47	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Ceiling Mount for Camera		
Make/Brand	INTEGRATOR / CUSTOM		
Minimum Performance Parameters			
Product Category	Ceiling Mount to hold Camera		

48. Required AV Connectors and long run cable

Item Reference	48	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Required AV Connectors and long run cable		
Make/Brand	NEUTRICK / AMPHENOL		
Minimum Performance Parameters			
Required AV Connectors			

49. Conceptualization, Design Engineering, Supply, Installation & Commissioning, Documentation & One Time User Orientation Charges

Item Reference	49	Compliance (Yes/No)	Details of Catalogue/ Data Sheet Proof with Page No in the tender document
Item Description	Conceptualization, Design Engineering, Supply, Installation & Commissioning, Documentation & One Time User Orientation Charges		
Make/Brand	INTEGRATOR / SERVICES		
Minimum Performance Parameters			
Conceptualization, Design Engineering, Supply, Installation & Commissioning, Documentation & One Time User Orientation Charges			

ANNEXURE - 5

**SUPPLY, INSTALLATION AND COMMISSIONING OF AUDIO AND VIDEO
CONFERENCING SYSTEM FOR SMART CLASSROOM of IIT MADRAS AS PER DESIGN
PROFORMA FORMAT FOR FINANCIAL BID (BOQ) FORMAT
Tender No. CE/RAVI/103/2023/SMARTCLASSAV**

S.No:	Description	UoM	Qty	Rate Per Unit	Total Cost without Tax	GST	Total Cost with Tax
1	98" UHD Display	Nos.	2				
2	85" UHD Interactive Display	No.	1				
3	85" UHD Display	No.	1				
4	PTZ Camera	Nos.	3				
5	Auto Tracking Software for PTZ Camera	No.	1				
6	24" Touch Display	No.	1				
7	12.9" iPad	No.	1				
8	Wireless Presentation System with Power Injector	No.	1				
9	16x8 HDMI Matrix switcher	No.	1				
10	HDMI Wallplate Twisted Pair Transmitter	No.	1				
11	HDMI Twisted Pair Transmitter	Nos.	10				
12	HDMI Twisted Pair Receiver	Nos.	11				
13	4K HDMI Seamless Multiview Presentation Matrix Switcher cum Scaler with USB Capture card	No.	1				
14	USB Twisted Pair Extender (Transmitter & Receiver)	Nos.	3				
15	USB3.0 Host Switcher	No.	1				
16	HDMI & Audio USB Bridge	No.	1				
17	5Gbps 4 Port SuperSpeed USB 3.0 Hub	No.	1				
18	Ceiling Tile Microphone	Nos.	4				
19	16 Port Unmanaged POE+ Switch	No.	1				
20	Digital Signal Processor	No.	1				
21	UCI Deployment Software License for DSP	No.	1				
22	Scripting Engine Software License for DSP	No.	1				
23	Software DANTE License for DSP	No.	1				
24	Two Channel Amplifier	No.	1				
25	Eight Channel Amplifier	No.	1				
26	Ceiling Speaker	Nos.	18				
27	AV Controller	No.	1				
28	10.2" iPad	No.	1				
29	Wi-Fi Access Point	No.	1				
30	USB Faceplate	No.	1				
31	6 Feet HDMI Male to Male Cable	Nos.	29				
32	9 Feet HDMI Male to Male Cable	No.	1				

33	6 Feet USB 3.0 Type A Male to Type B Male Cable	Nos.	4			
34	6 Feet USB 2.0 Type A Male to Type B Male Cable	Nos.	4			
35	10 Feet USB 2.0 Type A Male to Type B Male Cable	No.	1			
36	10 Feet USB 2.0 Type A Male to Type A Male Cable	No.	1			
37	DGKat / HDBaseT / LAN Cable	Meters	900			
38	RJ45 Connector	Nos.	50			
39	Twisted Pair Cable for Control	Meters	150			
40	Serial Control / Audio Cable	Meters	20			
41	Speaker Cable	Meters	300			
42	DVI-D Male to HDMI Female Adapter Cable	Nos.	2			
43	17U AV Rack with 650mm Depth	No.	1			
	Power Distribution Unit Vertical	No.	2			
	Rack Shelf	Nos.	6			
	1U - Blank Spacer	Nos.	4			
	Rack Equipment Cooling Fan	Set	1			
	Castor Wheels with Lock	Set	2			
44	Heavy Duty Wall Mount for 98" Display	Nos.	2			
45	Heavy Duty Wall Mount for 85" Interactive Display	No.	1			
46	Heavy Duty Ceiling Mount for 85" Display	No.	1			
47	Ceiling Mount for Camera	Nos.	3			
48	Required AV Connectors and long run cables	Lot	1			
49	Conceptualization, Design Engineering, Supply, Installation & Commissioning, Documentation & One Time User Orientation Charges	Ls	1			
50	L1 support engineer to address the AV issue onsite for smart class room (Optional for 1 year from the date of handover)	Nos.	1			
51	Comprehensive AMC should be quoted for 4 th year only for active components (Optional)	Nos.	1			
52	Comprehensive AMC should be quoted for 5 th year components (Optional)	Nos.	1			

- **Note: Price for Line item 50 – 52(optional items) will not be considered for Price Bid Evaluation.**

Annexure: 6

FORMAT FOR AFFIDAVIT OF SELF-CERTIFICATION UNDER PREFERENCE TO MAKE IN INDIA – PER ITEM

Tender Reference Number:

Name of the item / Service:

Date: _____

I/We _____ S/o, D/o, W/o, _____
Resident of

Hereby solemnly affirm and declare as under:

That I will agree to abide by the terms and conditions of the Public Procurement (Preference to Make in India) Policy vide Gol Order no. P-45021/2/2017-PP (B.E.-II) dated 15.06.2017 (subsequently revised vide orders dated 28.05.2018, 29.05.2019 and 04.06.2020) MOCI order No. 45021/2/2017-PP (BE II) Dt.16th September 2020 & P- 45021/102/2019-BE-II-Part (1) (E-50310) Dt.4th March 2021 and any subsequent modifications/Amendments, if any and

That the local content for all inputs which constitute the said item/service/work has been verified by me and I am responsible for the correctness of the claims made therein.

Tick (✓) and Fill the Appropriate Category	
<input type="checkbox"/>	I/We _____ [name of the supplier] hereby confirm in respect of quoted items that Local Content is equal to or more than 50% and come under “Class-I Local Supplier” category.
<input type="checkbox"/>	I/We _____ [name of the supplier] hereby confirm in respect of quoted items that Local Content is equal to 20% but less than 50% and come under “Class-II Local Supplier” category.

- The details of the location (s) at which the local value addition is made and the proportionate value of local content in percentage

Address _____ Percentage of Local content: _____ %

For and on behalf of.....(Name of firm/entity)

Authorized signatory (To be duly authorized by the Board of Directors)

<Insert Name, Designation and Contact No.>

[Note: In case of procurement for a value in excess of Rs. 10 Crores, the bidders shall provide this certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.]

This letter should be on the letterhead of the quoting firm and should be signed by a competent authority. Non-submission of this will lead to Disqualification of bids.

ANNEXEUR: 7

CERTIFICATE

(To be given on the letter head of the bidder)

No:

Dated:

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and hereby certify that I am not from such a country.

OR (whichever is applicable)

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and hereby certify that I from _____(Name of Country) and has been registered with the Competent Authority. I also certify that I fulfil all the requirements in this regard and is eligible to be considered.

(Copy/ evidence of valid registration by the Competent Authority is to be attached)

Place:

Signature of the Tenderer

Date:

Name & Address of the
Tenderer with Office Stamp



CENTRE FOR INDUSTRIAL CONSULTANCY & SPONSORED RESEARCH (IC&SR)
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI 600 036



ELECTRONIC CLEARING SERVICE (Credit Clearing)/ REAL TIME GROSS SETTLEMENT (RTGS) FACILITY FOR RECEIVING PAYMENTS

A. Details of Account Holder

Name of the Institution	Indian Institute of Technology - Madras
Complete Contact Address	Industrial Consultancy and Sponsored Research Indian Institute of Technology-Madras, IIT- Madras Campus Post Office, Sardar Patel Road, Guindy, CHENNAI - 600 036
Telephone No./ Fax No.	Tel - 044-2257 8356
E- mail ID of the FO/AO/REG/DIR	dricsr@iitm.ac.in

B. Bank Account Details:

Institution Account Name (As per Bank Record)	The Registrar, Indian Institute of Technology - Madras
Account No.	2722101003872
Account Print Name	IIT F A/C , The Registrar IIT Madras
IFSC CODE	CNRB0002722
Bank Name (in full)	Canara Bank
Branch Name	IIT-Madras Branch
Complete Branch Address	Canara Bank, IIT-Madras Branch, IIT- Madras Campus Post Office, Sardar Patel Road, Guindy, CHENNAI - 600 036
MICR No.	600015085
Account Type	Savings Account

Certified that the Institute's account is in an RTGS enabled branch.

I hereby declare that the particulars given above are correct and complete.

Date:

Signature of the Competent Authority
of the Institution with seal.

ANNEXEUR: 9

Self-Declaration that the Service Provider has not been Blacklisted

(To be given on the letter head of the bidder)

I..... S/o.....

R/o police station District Director

/ partner/ sole proprietor (Strike out whichever is not applicable) of

..... (Firm or Company) do hereby declare and solemnly affirm:

- I. That the Firm has not been Blacklisted or declared insolvent by any of the Union or State Government / Organization.
- II. That none of the individual / firm / Company Blacklisted or any partners or shareholder thereof has any connection directly or indirectly with or has any subsistence interest in the deponent business / firm company.
- III. That neither the Firm nor any of its partner has been involved / convicted in any criminal case / economic offence nor any criminal case / economic offence is pending against firm or any partner of the Firm before any Court of Law / Police.

Place:

Date:

Signature of the Tenderer

Name & Address of the

Tenderer with Office Stamp

ANNEXEUR: 10
OEM CERTIFICATION FORM
(In Original Letter Head of OEM)

TenderNo: Dated:

We are Original Equipment Manufacturers (OEM) of..... (Name of the company)

Ms..... (Name of the vendor) is one of our Distributors/Dealers/Resellers/Partners
(tick one) for the and is participating in the above-mentioned tender by
offering our product model.....(Name of the product with model number).

..... is authorized to bid, sell and provide service support warranty for our product
as mentioned above.

Name and Signature of the authorized
signatory of OEM along with
seal of the company with Date