Notice Inviting Quotation (E-Procurement mode)
कोटेशन को आमंत्रित करने की सूचना (इ-प्रोक्योर्मेंट मोड)

INDIAN INSTITUTE OF TECHNOLOGY DELHI
भारतीय प्रौद्योगिकी संस्थान दिल्ली
HAUZ KHAS, NEW DELHI-110016
हौज ख़ास, नई दिल्ली -110016

Dated/ दिनांक **: 20/11/2026**

Open Tender Notice No. / खुला प्रस्ताव निविदा सूचना नंबर: IITD/CARE(SP-5470)/2026

Indian Institute of Technology Delhi is in the process of purchasing following item(s) as per details as given as under.
इंडियन इंस्टीट्यूट ऑफ टेक्नोलॉजी दिल्ली निम्नलिखित मदों की खरीद की प्रक्रिया में है।

Details of the item आइटम का विवरण	**Semiconducting Qubit Measurement and Control System**
Earnest Money Deposit to be submitted बयाना जमा करने के लिए जमा राशि	**NIL.** However, bidders are required to submit 'Bid Security Undertaking' in lieu of EMD (Annexure-IX)
Warranty वारंटी अवधि	**3 Years/3** साल
Performance security निष्पादन सुरक्षा	**3% of Contract value as per MoF OM No. F.1/2/2023-PPD dated 3-4-2023**
Delivery Schedule	***16-18 weeks*** Pl. refer Terms & Conditions No.12

Tender Documents may be downloaded from Central Public Procurement Portal http://eprocure.gov.in/eprocure/app . Aspiring Bidders who have not enrolled / registered in e-procurement should enroll / register before participating through the website http://eprocure.gov.in/eprocure/app . The portal enrolment is free of cost. Bidders are advised to go through instructions provided at 'Instructions for online Bid Submission'.
निविदा दस्तावेज केन्द्रीय सार्वजनिक खरीद पोर्टल http://eprocure.gov.in/eprocure/app से डाउनलोड हो सकते हैं ई-प्रोक्योरमेंट में पंजीकृत नहीं होने वाले इच्छुक बोलीदाताओं को वेबसाइट http://eprocure.gov.in/eprocure/app के माध्यम से भाग लेने से पहले पंजीकरण करना चाहिए। पोर्टल नामांकन मुफ्त है बोलीदाताओं को सलाह दी जाती है कि 'ऑनलाइन बोली के लिए निर्देश' पर दिए गए निर्देशों के माध्यम से जाने की सलाह दी जाए।Tenderers 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 Delhi tenders). Select the appropriate tender and fill them with all relevant information and submit the completed tender document online on the website http://eprocure.gov.in/eprocure/app as per the schedule given in the next page.
निविदाकर्ता वेबसाइट पर निविदा दस्तावेज का उपयोग कर सकते हैं (एनआईसी साइट में खोज के लिए, कृपया निविदा खोज विकल्प और 'आईआईटी' टाइप करें। उसके बाद, सभी आईआईटी दिल्ली निविदाओं को देखने के लिए "गो" बटन पर क्लिक करें) उपयुक्त निविदा का चयन करें और उन्हें सभी प्रासंगिक सूचनाओं से भरें और वेबसाइट पर http://eprocure.gov.in/eprocure/app पर पूरा निविदा दस्तावेज ऑनलाइन जमा करें। अगले पृष्ठ में दिए गए कार्यक्रम के अनुसार
No manual bids will be accepted. All quotation (both Technical and Financial should be submitted in the E-procurement portal).
कोई मैन्युअल बोली स्वीकार नहीं की जाएगी। सभी कोटेशन (तकनीकी और वित्तीय दोनों को ई-प्रोक्योरमेंट पोर्टल में जमा करना चाहिए)

SCHEDULE

Name of Organization	Indian Institute of Technology Delhi
Tender Type (Open/Limited/EOI/Auction/Single/Global)	Global
Tender Category (Services/Goods/works)	Goods
Type/Form of Contract (Work/Supply/ Auction/ Service/ Buy/ Empanelment/ Sell)	Buy
Product Category (Civil Works/Electrical Works/Fleet Management/ Computer Systems)	Electrical Works
Source of Fund (Institute/Project)	Budget Code _Equipment_ / Project Code _RP04952G_SN___
Is Multi Currency Allowed	YES
Date of Issue/Publishing	20/11/2026 (17:00 Hrs)
Document Download/Sale Start Date	20/11/2026 (17:00 Hrs)
Document Download/Sale End Date	18/12/2026 (15:00 Hrs)
Last Date and Time for Uploading of Bids	18/12/2026 (15:00 Hrs)
Date and Time of Opening of Technical Bids	21/12/2026 (15:00 Hrs)
Tender Fee	Rs.__NIL_/- (For Tender Fee) (To be paid through RTGS/NEFT. IIT Delhi Bank details are as under: Name of the Bank A/C : IITD Revenue Account SBI A/C No. : 10773572622 Name of the Bank : State Bank of India, IIT Delhi, Hauz Khas, New Delhi-110016 IFSC Code : SBIN0001077 MICR Code : 110002156 Swift No. : SBININBB547 (This is mandatory that UTR Number is provided in the on-line quotation/bid. (Kindly refer to the UTR Column of the Declaration Sheet at Annexure-II)
No. of Covers (1/2/3/4)	02
Bid Validity days (180/120/90/60/30)	90 days (From last date of opening of tender)
Address for Communication	Prof. Samaresh Das, Centre for Applied Research in Electronics, Room No:- 213, Block-III, IIT Delhi, Hauz Khas, New Delhi
Contact No.	+91-11-2659 6102 (O)
Email Address	samareshdas@care.iitd.ac.in

Chairman Purchase Committee
(Buyer Member)

Instructions for Online Bid Submission/ ऑनलाइन बोली (बिड) के लिए निर्देश:

As per the directives of Department of Expenditure, this tender document has been published on the Central Public Procurement Portal (URL:http://eprocure.gov.in/eprocure/app). 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.

व्यय विभाग के निर्देशों के अनुसार, यह निविदा दस्तावेज केंद्रीय सार्वजनिक प्रापण पोर्टल (यूआरएल: http: //eprocure.gov.in/eprocure/app) पर प्रकाशित किया गया है। बोलीदाताओं को मान्य डिजिटल हस्ताक्षर प्रमाण पत्र का उपयोग करते हुए सीपीपी पोर्टल पर इलेक्ट्रॉनिक रूप से अपनी बोलियों की सॉफ्ट प्रतियां जमा करना आवश्यक है। सीपीपी पोर्टल पर पंजीकरण करने के लिए निविदाकर्ताओं की सहायता करने के लिए नीचे दिए गए निर्देशों का मतलब है, सीपीपी पोर्टल पर आवश्यकताओं के अनुसार अपनी बोलियां तैयार करें और अपनी बोलियां ऑनलाइन जमा करें।

More information useful for submitting online bids on the CPP Portal may be obtained at:

अधिक जानकारी सीपीपी पोर्टल पर ऑनलाइन बोलियां जमा करने के लिए उपयोगी हो सकती है:

http://eprocure.gov.in/eprocure/app

REGISTRATION

1) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL:http://eprocure.gov.in/eprocure/app) by clicking on the link "Click here to Enroll". Enrolment on the CPP Portal is free of charge.

   बोलीदाताओं को "नामांकन के लिए यहां क्लिक करें" लिंक पर क्लिक करके सेंट्रल पब्लिक प्रोक्युरमेंट पोर्टल (यूआरएल: http: //eprocure.gov.in/eprocure/app) के ई-प्रोक्योरमेंट मॉड्यूल पर भर्ती करना आवश्यक है। सीपीपी पोर्टल पर नामांकन नि: शुल्क है

2) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.

   नामांकन प्रक्रिया के भाग के रूप में, बोलीदाताओं को अपने खाते के लिए एक अद्वितीय उपयोगकर्ता नाम चुनना होगा और एक पासवर्ड प्रदान करना होगा।

3) 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.

   बोलीदाताओं को सलाह दी जाती है कि पंजीकरण प्रक्रिया के भाग के रूप में अपना वैध ईमेल पता और मोबाइल नंबर पंजीकृत करें। इन का उपयोग सीपीपी पोर्टल से किसी भी संचार के लिए किया जाएगा।

4) 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.), with their profile.

   नामांकन पर, बोलीदाताओं को सीसीए इंडिया द्वारा मान्यता प्राप्त किसी प्रमाणन प्राधिकरण द्वारा जारी किए गए अपने मान्य डिजिटल हस्ताक्षर प्रमाण पत्र (कक्षा द्वितीय या कक्षा III प्रमाण पत्र के साथ महत्वपूर्ण उपयोग पर हस्ताक्षर करने) की आवश्यकता होगी (जैसे सिफी / टीसीएस / एनकोड / ई-मुद्रा आदि) , उनके प्रोफाइल के साथ

5) 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.

   केवल एक मान्य डीएससी एक बोलीदाता द्वारा पंजीकृत होना चाहिए। कृपया ध्यान दें कि निविदाकर्ता यह सुनिश्चित करने के लिए ज़िम्मेदार हैं कि वे अपने डीएससी को दूसरों को उधार नहीं देते हैं जिससे दुरुपयोग हो सकता है।

6) Bidder then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / eToken.

बोलीदाता फिर अपने यूजर आईडी / पासवर्ड और डीएससी / ईटीकेन के पासवर्ड को दर्ज करके सुरक्षित लॉग-इन के माध्यम से साइट पर लॉग ऑन करता है।

SEARCHING FOR TENDER DOCUMENTS/ निविदा दस्तावेजों के लिए खोजना

1) 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.

सीपीपी पोर्टल में निर्मित विभिन्न खोज विकल्प हैं, ताकि बोलीदाताओं को कई मापदंडों से सक्रिय निविदाएं खोज सकें। इन मापदंडों में निविदा आईडी, संगठन का नाम, स्थान, तिथि, मूल्य आदि शामिल हो सकते हैं। निविदाओं के लिए उन्नत खोज का एक विकल्प भी है, जिसमें बोलीदाता कई नामों को जोड़ सकते हैं जैसे संगठन का नाम, अनुबंध का स्थान, स्थान, सीपीपी पोर्टल पर प्रकाशित निविदा की खोज के लिए तारीख, अन्य कीवर्ड आदि।

2) 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 Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.

बोलीदाताओं ने एक बार निविदाएं चुनी हैं जिसमें वे रुचि रखते हैं, उसका वे आवश्यक दस्तावेज / निविदा कार्यक्रम डाउनलोड कर सकते हैं। ये निविदाएं 'मेरी निविदाओं' फ़ोल्डर में ले जाई जा सकती हैं। इससे सीपीपी पोर्टल को बोलीदाताओं को एसएमएस / ई-मेल के माध्यम से सूचित किया जा सकता है, यदि निविदा दस्तावेज में कोई शुद्धि जारी कि गई है।

3) 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.

बोलीदाता को प्रत्येक निविदा को निर्दिष्ट अद्वितीय निविदा आईडी का नोट बनाना चाहिए, अगर वे हेल्पडेस्क से कोई स्पष्टीकरण / सहायता प्राप्त करना चाहते हैं।

PREPARATION OF BIDS / बोली (बिड) की तैयारी

1) Bidder should take into account any corrigendum published on the tender document before submitting their bids.

बोलीदाता को अपनी बोलियां जमा करने से पहले निविदा दस्तावेज पर प्रकाशित किसी भी शुद्धि को ध्यान में रखना चाहिए।

2) 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.

कृपया बोली के भाग के रूप में जमा किए जाने वाले दस्तावेजों को समझने के लिए निविदा विज्ञापन और निविदा दस्तावेज ध्यान से देखें। कृपया उन अंकों की संख्या पर ध्यान दें जिन में बोली दस्तावेज जमा करना है, दस्तावेजों की संख्या - जिसमें प्रत्येक दस्तावेज के नाम और सामग्री शामिल हैं, जिन्हें प्रस्तुत करने की आवश्यकता है। इनमें से कोई भी विचलन बोली को अस्वीकार कर सकता है।

3) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF formats. Bid documents may be scanned with 100 dpi with black and white option.

बोलीदाता, अग्रिम में, निविदा दस्तावेज / अनुसूची में बताए अनुसार प्रस्तुत करने के लिए बोली दस्तावेज तैयार करना चाहिए और आम तौर पर, वे पीडीएफ / एक्सएलएस / आरएआर / डीडब्ल्यूएफ स्वरूपों में हो सकते हैं। बोली दस्तावेजों को 100 डीपीआई के साथ काले और सफेद विकल्प स्कैन किया जा सकता है।

4) 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, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Space" area available to them to upload such documents. These documents may be directly submitted from the "My Space" 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.

   मानक दस्तावेजों के एक ही सेट को अपलोड करने के लिए आवश्यक समय और प्रयास से बचने के लिए जो प्रत्येक बोली के भाग के रूप में जमा करने के लिए आवश्यक हैं, ऐसे मानक दस्तावेज अपलोड करने का प्रावधान (जैसे पैन कार्ड कॉपी, वार्षिक रिपोर्ट, लेखा परीक्षक प्रमाण पत्र आदि)) बोलीदाताओं को प्रदान किया गया है। ऐसे दस्तावेजों को अपलोड करने के लिए बोलीकर्ता उनके लिए उपलब्ध "मेरा स्पेस" क्षेत्र का उपयोग कर सकते हैं। बोली जमा करते समय ये दस्तावेज़ सीधे "मेरा स्पेस" क्षेत्र से जमा किए जा सकते हैं, और उन्हें बार-बार अपलोड करने की ज़रूरत नहीं है इससे बोली जमा प्रक्रिया के लिए आवश्यक समय में कमी आएगी।

SUBMISSION OF BIDS/ बोली (बिड) का जमा करना

1) Bidder should log into the site well in advance for bid submission so that he/she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.

   बोलीदाता को बोली प्रस्तुति के लिए अच्छी तरह से साइट पर लॉग इन करना चाहिए ताकि वह समय पर बोली अपलोड कर सके या फिर बोली प्रस्तुत करने के समय से पहले। अन्य मुद्दों के कारण किसी भी देरी के लिए बोलीदाता जिम्मेदार होगा।

2) The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.

   बोलीदाता को निविदा दस्तावेज में दर्शाए अनुसार एक-एक करके आवश्यक बोली दस्तावेजों को डिजिटल हस्ताक्षर और अपलोड करना होगा।

3) Bidder has to select the payment option as "on-line" to pay the tender fee / EMD as applicable and enter details of the instrument. Whenever, EMD / Tender fees is sought, bidders need to pay the tender fee and EMD separately on-line through RTGS (Refer to Schedule, Page No.2).

   बोलीदाता को निविदा शुल्क / ईएमडी को भुगतान के लिए "ऑन लाइन" के रूप में भुगतान विकल्प चुनना होगा और उपकरण का विवरण दर्ज करना होगा। जब भी, ईएमडी / निविदा शुल्क की मांग की जाती है, बोलीदाताओं को टेंडर शुल्क और ईएमडी अलग-अलग आरटीजीएस के माध्यम से ऑन लाइन पर भुगतान करने की आवश्यकता होती है (अनुसूची, पेज नं .2 देखें)।

4) A standard BoQ format has been provided 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 white colored (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.

   एक मानक BoQ प्रारूप को सभी बोलीदाताओं द्वारा भरने के लिए निविदा दस्तावेज प्रदान किया गया है। बोलीदाताओं को इस बात का ध्यान रखना चाहिए कि उन्हें आवश्यक प्रारूप में अपनी वित्तीय बोली जमा करनी चाहिए और कोई अन्य प्रारूप स्वीकार्य नहीं है। बोलीकर्ताओं को BoQ फाइल को डाउनलोड करने, इसे खोलने और अपने संबंधित वित्तीय उद्धरण और अन्य विवरण (जैसे बोलीदाता का नाम) के साथ सफेद रंगीन (असुरक्षित) कोशिकाओं को पूरा करना आवश्यक है। कोई भी अन्य कक्ष नहीं बदला जाना चाहिए। एक बार विवरण पूरा हो जाने पर, बोलीदाता को इसे सहेजना होगा और इसे ऑनलाइन जमा करना होगा, बिना फ़ाइल नाम बदलना। यदि BOQ फ़ाइल को बोलीदाता द्वारा संशोधित किया गया है, तो बोली को खारिज कर दिया जाएगा।

5) 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.

सर्वर का समय (जो बोलीदाताओं के डैशबोर्ड पर प्रदर्शित होता है) बोलीदाताओं द्वारा बोलियों को खोलने के लिए समय सीमा को संदर्भित करने के लिए मानक समय के रूप में माना जाएगा। बोलीदाताओं को खोलना आदि। बोलीदाताओं को बोली प्रस्तुत करने के दौरान इस समय का पालन करना चाहिए।

6) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done.

   बोलीदाताओं द्वारा प्रस्तुत सभी दस्तावेज पीकेआई एन्क्रिप्शन तकनीकों का उपयोग करके एन्क्रिप्ट किया जाएगा जिससे डेटा की गोपनीयता सुनिश्चित हो सके। दर्ज किए गए डेटा को अनधिकृत व्यक्तियों द्वारा बोली खोलने के समय तक नहीं देखा जा सकता है। बोलियों की गोपनीयता को सुरक्षित सॉकेट लेयर 128 बिट एन्क्रिप्शन तकनीक का उपयोग कर रखा जाता है। संवेदनशील क्षेत्रों का डेटा संग्रहण एन्क्रिप्शन किया जाता है।

7) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.

   अपलोड किए गए निविदा दस्तावेज केवल अधिकृत बोलीदाता द्वारा निविदा खोलने के बाद ही पठनीय हो सकते हैं।

8) 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.

   बोलियों के सफल और समय पर जमा होने पर, पोर्टल एक सफल बोली प्रस्तुत करने का संदेश देगा और एक बोली सारांश बोली संख्या के साथ प्रदर्शित किया जाएगा। और अन्य सभी प्रासंगिक विवरणों के साथ बोली प्रस्तुत करने की तारीख और समय।

9) Kindly add scanned PDF of all relevant documents in a single PDF file of compliance sheet.

   कृपया अनुपालन पत्रक की एक पीडीएफ फाइल में सभी प्रासंगिक दस्तावेजों के स्कैन किए गए पीडीएफ़ को जोड़ दें।

ASSISTANCE TO BIDDERS / बोलीदाताओं को सहायता

1) 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.

   निविदा दस्तावेज से संबंधित कोई भी प्रश्न और इसमें निहित नियमों और शर्तों को निविदा आमंत्रण प्राधिकरण को निविदा के लिए या निविदा में वर्णित प्रासंगिक संपर्क व्यक्ति से संबोधित किया जाना चाहिए।

2) 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 1800 233 7315.

   ऑनलाइन बोली प्रस्तुत करने या सामान्य में सीपीपी पोर्टल से संबंधित प्रश्नों की प्रक्रिया से संबंधित कोई भी प्रश्न 24x7 सीपीपी पोर्टल हैल्पडेस्क पर निर्देशित किया जा सकता है। हेल्पडेस्क के लिए संपर्क संख्या 1800 233 7315 है

General Instructions to the Bidders / बोलीदाताओं के लिए सामान्य निर्देश

1) The tenders will be received online through portal http://eprocure.gov.in/eprocure/app . In the Technical Bids, the bidders are required to upload all the documents in .pdf format.
   निविदाएं पोर्टल http://eprocure.gov.in/eprocure/app के माध्यम से ऑनलाइन प्राप्त होंगी तकनीकी बोलियों में, बोलीदाताओं को सभी दस्तावेजों को। पीडीएफ प्रारूप में अपलोड करना होगा।

2) 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://eprocure.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://eprocure.gov.in/eprocure/app under the link “Information about DSC”.
कंपनी के नाम में स्मार्ट कार्ड / ई-टोकन के रूप में मान्य क्लास II / III डिजिटल हस्ताक्षर प्रमाण पत्र (डीएससी) के पंजीकरण के लिए एक शर्त है और https://eprocure.gov.in/eprocure/ के माध्यम से बोली प्रस्तुत करने की गतिविधियों में भाग ले सकते है। डिजिटल हस्ताक्षर प्रमाण पत्र अधिकृत प्रमाणित एजेंसियों से प्राप्त की जा सकती है, जिनमें से जानकारी "डीएससी के बारे में सूचना" लिंक के तहत वेब साइट https://eprocure.gov.in/eprocure/app पर उपलब्ध है।

3) Tenderer are advised to follow the instructions provided in the ‘Instructions to the Tenderer for the e-submission of the bids online through the Central Public Procurement Portal for e Procurement at https://eprocure.gov.in/eprocure/app.
निविदाकर्ता को सलाह दी जाती है कि वे निविदाकार को निर्देश दिए गए हों ताकि ई-प्रोक्योरमेंट के लिए सेंट्रल पब्लिक प्रोकॉर्ममेंट पोर्टल के जरिए https://eprocure.gov.in/eprocure/app पर ऑनलाइन निविदाएं जमा कर सकें।

Centre for Applied Research in Electronics
Indian Institute of Technology
Hauz Khas, New Delhi-110 016

NOTICE INVITING QUOTATIONS

Subject : Semiconducting Qubit Measurement and Control System

Invitation for Tender Offers

Indian Institute of Technology Delhi invites online Bids (Technical bid and Commercial bid) from eligible and experienced OEM (Original Equipment Manufacturer) OR OEM Authorized Dealer for **supply, installation & integration of Semiconducting Qubit Measurement and Control System** with (warranty period as stated at page #1 of this tender) on site comprehensive warranty from the date of receipt of the material as per terms & conditions specified in the tender document, which is available on CPP Portal http://eprocure.gov.in/eprocure/app

TECHNICAL SPECIFICATION:

Semiconducting Qubit Measurement and Control System

1. This procurement consists of Semiconducting Qubit Measurement and Control System with DAC, Arbitrary waveform generator, Vector signal generator, Quantum board, Qbox, RF components and other optional items.
2. All the above-mentioned items of the Semiconducting Qubit Measurement and Control System are required to function as a single integrated setup and hence must be compatible with each other in terms of synchronization of applied voltage, demodulation of readout signals, connector compatibility, and device-level performance. Specifically,

- The **Digital to Analogue Converter** (DAC), **Qbox**, and **QFilter** must be compatible with each other to supply low-noise DC voltages to the gates and reservoirs of gate-defined quantum dot devices. When installed on the dilution refrigerator, the system shall allow an electron temperature of no more than 50 mK above the base temperature (~10 mK).
- The **Arbitrary Waveform Generator** (AWG), **Vector Signal Generator** (VSG) and the **Digital to Analogue Converter** (DAC) shall be mutually compatible so that they can be used together to perform fast tuning of quantum dot devices through two-dimensional gate-gate (charge stability) scans, with one gate voltage swept rapidly by the AWG and the other stepped by the DAC.
- The system shall be controllable from a single software environment so that DAC voltage stepping and AWG, VSG sweeps are synchronized within one program.

3. A declaration on company letterhead regarding these compatibility requirements from the bidders will be mandatory at the time of bid submission. Please provide a declaration with technical details of the compatibility between all the items.
4. The technical evaluation will be based on technical specs as well as the compatibility between different items.
5. Vendor should include all the required accessories to run the full system as per tender specification capability
6. The financial L1 will be decided based on the combined price of full system.

Parameter	Specification
Digital to Analog Converter	
Number of independent channels	24
Voltage	±10 V and ±2 V, Should be able to configure for each channel separately
DC Voltage resolution	25 bits or better
Current output	10 mA or better
Current sensing	Every channel should be able to measure the sourcing/leakage current independently with a Current resolution of 20 pA or lower
Output impedance	50 Ohms
Output filter	Selectable, with a minimum cut off 10 Hz, and maximum cut off of 300 kHz for each output channel
Voltage Stability	±2 µV for over 40 hours
Voltage noise floor	10 $nV/Hz^{1/2}$ or lower at 100 Hz
Sample rate	1 MHz or better
Rise time	5 µs or shorter
Available waveforms on each channel	Sine, Square, Triangle.
Output frequency	DC to 250 kHz or higher
Waveform generator	One/channel
Computer interfacing, Control and automation	Should have LAN and USB interfaces. Should be able to control and automate using QCodes.
Trigger options	Should have isolated trigger options for input and output
Power requirements	Should operate on standard single-phase power outlets in the country. The offer should include any power adapters required to operate the unit.
Formfactor	19-inch rack-mountable.
Cable requirement	Fischer cable, 1 flange, 3m Cable Fischer (male) to Fischer (male), 24 channel, double shielded twisted pairs, one flange, 3 meters which connects to cryostat should be provided.
Quantity	Two
Warranty	One-year warranty from the date of successful installation/commissioning of equipment.

Arbitrary Waveform Generator, Vector Signal Generator	
Low frequency output channel characteristics	All channels should be phase and time synchronous
	Each low-frequency control must have at least 8 analog independent output channels, each capable of producing microwave pulses to drive magnetic flux in the qubit or coupler in the range DC – 750 MHz or wider.
	DAC sampling rate: 2 GSa/s or higher
	DAC Vertical resolution: 16-bit or higher
	Bandwidth: DC – 750 MHz or wider.
	Number of Digital outputs: at least 1 per output channel or more.
	Rise time < 500 ps @ 0.8 Vpp step
	Voltage range: 1 Vpp or wider.
	Voltage noise: 10 nV/sqrt (Hz) at 100 kHz measured for 1 Vpp
	Phase noise: -145 dBc/Hz or less (at 100 MHz with 10 kHz offset).
	Total harmonic distortion: 65 dBc or higher.
	Spurious free dynamic range (SFDR): 55 dBc or higher (within the entire frequency range and without any external filtration).
	All channels must be synchronized by 2 GHz reference clock
	Must contain finite impulse response (FIR) filters and infinite impulse response (IIR) filters that are both implemented in FPGA logic.
	Quantity- Two
	One year warranty should be available
Low frequency Input channel characteristics	Each low-frequency control module must have at least 2 analog independent input channels, with capability to demodulate and digitize measurement signals with carrier frequencies in the range 0 – 750 MHz or wider.
	Each input channel can digitize incoming microwave pulses with 8 multiplexed signals, and independently process each signal.
	Digitizer sampling rate: 2 GSa/s for each channel or higher, ADC vertical resolution: 12-bit or higher.

	Bandwidth: DC – 750 MHz or wider.
	Input impedance: 50 Ohm. Input channel type: SMA.
High frequency output channel characteristics	Each high-frequency control module must have at least 8 analog independent output channels, each capable of generating arbitrarily shaped microwave pulses to drive qubits or probe readout resonators with frequency in the range 0.05 – 10.5 GHz or wider.
	Signal generation needs to be based on pure direct digital synthesis (DDS) technology for all frequencies up to 10.5GHz, without requiring any analog frequency upconversion stages (e.g., analog mixers).
	The integrated system must have digital-to-analog converters (DACs) for qubit control. Vertical resolution: 16-bit or higher.
	Waveform sampling rate: minimum 2 GSa/s (1 GSa/s for each quadrature)
	Realtime Bandwidth: 800 MHz
	Output impedance: 50 Ohm. Output channel type: SMA
	Allows to frequency multiplex tones within a span of at least 2GHz with no analog combiners and/or analog mixers.
	Number of Digital outputs: at least 1 per output channel or more.
	Full scale output power range from -11 to +16 dBm or wider.
	Phase noise: -125 dBc/Hz at 6 GHz, 10 kHz offset or better
	Worst harmonic component: 40 dBc or higher at 0 dBm.
	Spurious free dynamic range (SFDR): 75 dBc or higher at 0 dBm (within the whole frequency range and without any external filtration or calibration need).
	The SFDR spec value must be specified for at least 1 GHz band around the carrier.
	SFDR spec value must be seamlessly attained, without any external filtering and with no calibration.
	The integrated system must provide control of the absolute phase of the RF carrier for each output channel.
	Direct Phase setting capabilities for the RF carrier.
	8 complex cores FPGA-based pulse processor

	Quantity- One
	One year or more warranty should be available
High frequency Input channel characteristics	The high-frequency control module must have at least 2 analog independent input channels, with capability to downconvert and digitize measurement signals with carrier frequencies in the range 1.8 – 10.5 GHz or wider.
	Each input channel can digitize incoming microwave pulses with 8 multiplexed signals, and independently process each signal.
	Hardware should be capable to support input sampling rate of 1GSa/s.
	Realtime Bandwidth: 800 MHz or wider
	Input impedance: 50 Ohm. Input channel type: SMA. Input power ranges from -40 to -10 dBm or wider.
Reference clock	The integrated device must have an input for an external frequency reference. It must support at least a standard 2 GHz clock.
Power line	The instrument should be compatible with the standard Indian power line (supply)
Markers	For sending marker and trigger signals, the integrated device must have at least one digital output channel per each analog RF output.
Rack compatibility	All the independent input and output channels should be distributed in one 19-inch rack-mountable unit
Operational Requirements	The integrated device must be capable of fully parametric waveform generation, waveform acquisition, real-time processing and control flow.
	The integrated device must be able to output conditional execution of both microwave pulse and baseband pulse based on analog measurement outcome followed by signal demodulation and integration, with feedback latency ≤200.
	The integrated device must support the following operational latencies: Amplitude update < 16 ns, Phase update < 32 ns, Frequency update < 150 ns.
	The integrated device must be capable of performing real-time analog

	feedback. The parameters of output pulses or continuous signals must be adjustable based on measured signals (or an arbitrary calculation performed on the input signals), without uploading an entirely new pulse waveform to the integrated device.
	The integrated device must support real-time modulation of all pulse parameters including envelope, amplitude, phase, frequency, duration and offsets.
	The integrated device must support real-time phase randomization for dynamical decoupling sequences.
	The integrated device must support pre-processing of data (i.e. averaging) before sending it to the host PC.
	The integrated device must support parallel and non-exclusive streaming of both the raw ADC traces and I, Q data.
	The integrated device must allow the arbitrary control of sweep parameters utilizing FPGA -based (or equivalent) control to perform parameter sweeps without time overhead, including parallel sweeping of multiple parameters.
	The integrated device must allow extensive control flow, including if/else, for, while, switch statements, conditional plays, nested loops.
	The integrated device must support programming new custom sequences, with access to FPGA (or equivalent) logic, including conditional statements, without need to implement or understand low-level programming.
	The integrated device must allow for adaptive automatic experiment termination based on arbitrary logic performed on running analysis results.
	The integrated device must support running typical subroutines such as active qubit reset or mid-experiment frequency tracking on arbitrary sequences.
	The integrated device must contain comprehensive library of hardware optimized mathematical functions implementable on the FPGA (or equivalent), including multiplication, division, log, exp, sqrt, without the need of low-level programming.
	The integrated device must allow the ability to switch frequency and return by maintaining phase coherence.
	The digital output channels are synchronized with the analog outputs.

	The integrated device must either be capable of calibration-free operation, or any required calibration of up- and down-conversion mixers for the high frequency control in the integrated device must be fully automatic and transparent to the user.
	The integrated device must support real-time, dynamic updates to the running quantum sequence based on data received from the classical accelerator without requiring any pausing or recompilation of the program.
Software & Control	Remote programming of each channel from a computer, via a single communication channel, which can be USB or Ethernet, should be provided.
	Must be compatible with QCodes
	The integrated device must be controllable via pulse-level language compatible with Python API and with real-time processing. Comprehensive API documentation must be provided, including programming examples. The integrated device should be easy to install and program.
	If the software or part of the software required to control the integrated device is not open source, the license must allow installing and using the control software on multiple computers. It must not be tied to a single control computer.
	Any future upgrade in the firmware should be provided free of cost.
Warranty	One-year warranty from the date of successful installation/commissioning of equipment.
QBox (Breakout box)	
Connector interface	Fischer connector (both input and output), BNC connectors (input)
Channel count	Minimum of 24 independent input signal channels per unit
Shielding	Fully shielded metallic enclosure maintaining continuous electromagnetic shielding (Faraday cage) from the input to the output
Control options	The breakout box should be able to connect 24 low-frequency channels to either a DAC channel, a ground, or leave them floating remotely, using commands sent from a computer.
	The automated breakout box should be able to connect any of 24 low-frequency channels to at least 8 other instruments through a switch matrix operated by commands sent over ethernet

	Cable Fischer (male) to Fischer (male), 24 channel, double shielded twisted pairs, one flange, 3 meters which connects to cryostat should be provided.
	The relays of the automated breakout box should be switchable within 100 ms.
Electrical performance	Low contact resistance and high insulation resistance between channels. • Minimal channel-to-channel crosstalk. • Suitable for precision DC and low-frequency measurements.
Rack compatibility	19" rack mountable
Wiring	Low-noise wiring (e.g., twisted pairs) suitable for sensitive DC measurements
Documentation	Complete pinout diagram and wiring documentation need to be provided
Quantity	Automated breakout box with fischer cables having quantity Two and Two quantities of power plug should be provided
Warranty	One-year warranty from the date of successful installation/commissioning of equipment.
Quantum Board	
Quantum board specifications	Prototype hardware will not be considered. The supplier must demonstrate the delivery of > 10 systems within the last year.
	Demonstrated simultaneous operation of multiple spin qubits
	Modular system capable of handling signal delivery from at least 48 DC lines and at least 16 RF lines with integrated bias tees as RC filters with option for backgating the chip cavity back-plane
	Spring contacting interposer between connectorized main board and chip-carrying daughterboard for signal handling up to 8 GHz
	Exchangeable daughterboards for handling hundreds of different samples without disposing of connectors or interposers
	SMT component placeholders for at least four LC tank circuits
	Non-magnetic design with no nickel plating of circuit boards or interposer spring contacts
	Signal integrity of combined DC and RF lines through bias tees, interposer and wire bonding up to 8 GHz

	All components for the connection of Quantum board to dilution refrigerator and for sample placement should be provided.
	Form factor for vertical and horizontal mounting in bottom loaders fitting within 60 mm diameter with 45 mm rail spacing (Bluefors BF60 or BF80).
	Quantum board quantity-one a) Daughterboard with sample space 10x10mm; quantity-20 b) Daughterboard, 6x6mm with tank circuits; quantity-5 c) Daughterboard, 10x10mm with tank circuits; quantity-10
RF components	
Filter	At least 24 channels low pass filter with 2 stage RC and RF filters
Filtering spec	3 dB attenuation at 65 kHz At least 60 dB attenuation at 50 MHz
Channel Isolation	More than 5 Gohm isolation per channel
Connectors	Micro-D connectors for input and output
Casing	Non-magnetic gold-plated copper
Temperature Compatibility	Compatible at cryogenic temperatures – mountable on the mixing chamber plate of a dilution refrigerator
Cable requirement	Jumper cable, 6 inches, 25-pin microD male to female should be provided
Quantity	Filter box Quantity- two; 6 inch jumper cable quantity- two
Optional items	
Cables and adapters	All adapters, connectors and cables needed for the connection of control electronics to dilution refrigerator and for the full operation of device both DC and RF measurements should be provided

A complete set of tender documents* may be Download by prospective bidder free of cost from the website http://eprocure.gov.in/eprocure/app. Bidder has to make payment of requisite fees (i.e. Tender fees (if any) and EMD) online through RTGS/NEFT only.

Terms & Conditions Details

Sl. No.	Specification
1.	**Due date**: The tender has to be submitted on-line before the due date. The offers received after the due date and time will not be considered. No manual bids will be considered.
2.	**Preparation of Bids**: The offer/bid should be submitted in two bid systems (i.e.) Technical bid and financial bid. The technical bid should consist of all technical details along with commercial terms and conditions. Financial bid should indicate item wise price for the items mentioned in the technical bid in the given format i.e BoQ_XXXX. The Technical bid and the financial bid should be submitted Online. ***Note: -Comparison of prices will be done ONLY on the bids submitted for the Main Equipment and anything asked as 'Optional' in the specs is not to be included for overall comparison.***
3.	**EMD (if applicable)**: The tenderer should submit an EMD amount through RTGS/NEFT. The Technical Bid without EMD would be considered as UNRESPONSIVE and will not be accepted. The EMD will be refunded without any interest to the unsuccessful bidders after the award of contract. Refer to Schedule (at page 1 of this document) for its actual place of submission.
4.	**Refund of EMD**: The EMD will be returned to unsuccessful Tenderer only after the Tenders are finalized. In case of successful Tenderer, it will be retained till the successful and complete installation of the equipment.
5.	**Opening of the tender**: The online bid will be opened by a committee duly constituted for this purpose. Online bids (complete in all respect) received along with EMD (if any) will be opened as mentioned at "Annexure: Schedule" in presence of bidders representative if available. Only one representative will be allowed to participate in the tender opening. Bid received without EMD (if present) will be rejected straight way. The technical bid will be opened online first and it will be examined by a technical committee (as per specification and requirement). The financial offer/bid will be opened only for the offer/bid which technically meets all requirements as per the specification, and will be opened in the presence of the vendor's representatives subsequently for further evaluation. The bidders if interested may participate on the tender opening Date and Time. The bidder should produce authorization letter from their company to participate in the tender opening.
6.	**Acceptance/ Rejection of bids:** The Committee reserves the right to reject any or all offers without assigning any reason.
7.	**Pre-qualification criteria:** (i) Bidders should be the manufacturer / authorized dealer. Letter of Authorization from original equipment manufacturer (OEM) on the same and specific to the tender should be enclosed. (ii) An undertaking from the OEM is required stating that they would facilitate the bidder on a regular basis with technology/product updates and extend support for the warranty as well. (Ref. Annexure-II) (iii) OEM should be internationally reputed Branded Company. (iv) Non-compliance of tender terms, non-submission of required documents, lack of clarity of the specifications, contradiction between bidder specification and supporting documents etc. may lead to rejection of the bid. (v) In the tender, either the Indian agent on behalf of the Principal/OEM or Principal/OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender. (vi) If an agent submits bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf of another Principal/OEM in the same tender for the same item/product.
8.	**Performance Security**: Performance Security may be furnished in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt from a Commercial bank, Bank Guarantee (including e-Bank Guarantee) from a Commercial bank or online payment in an acceptable form safeguarding the purchaser's interest in all respects within 21 days from the date of

	receipt of the purchase order/LC and should be kept valid for a period of 60 days beyond the date of completion of warranty period.
9.	**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, it's 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.
10.	**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.
11.	**Packing Instructions**: Each package will be marked on three sides with proper paint/indelible ink, the following: i. Item Nomenclature ii. Order/Contract No. iii. Country of Origin of Goods iv. Supplier's Name and Address v. Consignee details vi. Packing list reference number
12.	**Delivery and Documents:** Delivery of the goods should be made within a maximum of 16 to 18 weeks *(for goods ready for shipment)* & Maximum *(To be filled by Purchaser)* weeks *(For special/ to be fabricated goods) from the date of the opening of LC*. Within 24 hours of shipment, the supplier shall notify the purchaser and the insurance company by email the full details of the shipment including contract number, railway receipt number/ AAP etc. and date, description of goods, quantity, name of the consignee, invoice etc. The supplier shall mail the following documents to the purchaser with a copy to the insurance company: 1. 4 Copies of the Supplier invoice showing contract number, goods' description, quantity 2. unit price, total amount; 3. Insurance Certificate if applicable; 4. Manufacturer's/Supplier's warranty certificate; 5. Inspection Certificate issued by the nominated inspection agency, if any 6. Supplier's factory inspection report; and 7. Certificate of Origin (if possible, by the beneficiary); 8. Two copies of the packing list identifying the contents of each package. 9. The above documents should be received by the Purchaser before arrival of the Goods (except where the Goods have been delivered directly to the Consignee with all documents) and, if not received, the Supplier will be responsible for any consequent expenses.
13.	**Delayed delivery:** If the delivery is not made within the due date for any reason, the Committee will have the right to impose penalty 1% per week and the maximum deduction is 10% of the contract value / price.

14.	**Prices**: The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges. The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. However, the percentage of taxes & duties shall be clearly indicated. The price should be quoted without custom duty and excise duty, since IIT Delhi is exempted from payment of Excise Duty and is eligible for concessional rate of custom duty. Necessary certificate will be issued on demand. **IN CASE OF IMPORTS, THE PRICE SHOULD BE QUOTED ON FOB/FCA ORIGIN AIRPORT BASIS ONLY.** Under special circumstances (only perishable chemicals), when the item is imported on CIF/CIP, please indicate CIF/CIP charges separately upto IIT Delhi indicating the mode of shipment. IIT Delhi will make necessary arrangements for the clearance of imported goods at the Airport/Seaport. Hence the price should not include the above charges. **At any circumstances, it is the responsibility of the foreign supplier to handover the material to our nominated forwarder at the origin airport after completing all the inland clearing.** In case of **CIF/CIP**, shipment information must be provided at **least 2 days in advance** before the landing of shipment along with the documents i.e. invoice, packing list, forwarder Name, address, contact No. in India to save penalty/demurrage charges (imposed by Indian Customs), failing which, these charges will be recovered from the supplier/Indian Agent. To avoid the penalty/ demurrage charges due to late filing of Bill of Entry, it is advisable to handover the shipment to the Freight forwarder nominated by the Logistic Agent contracted by IITD. ***Note: -Comparison of prices will be done ONLY on the bids submitted for the Main Equipment and anything asked as 'Optional' in the specs is not to be included for overall comparison.***
15.	**Evaluation of Price/Financial Bid:** For the bids surviving the technical evaluation which have been found to be responsive the evaluation & comparison shall be made as under: 1. *If the response to the tender consists only of* ***Indigenous Offers*** (i) The final landing cost of purchase after all discounts, freight, forwarding, insurance, taxes etc. shall be the basis of evaluation. (ii) In the case of goods manufactured in India or goods of foreign origin already located in India, GST and excise duty (if applicable) and other similar taxes and duties, which will be contractually payable (to the tenderer) on the goods are to be added and will be considered in determination of evaluation criteria for L-1 in those cases where only Indian bidders are competing. 2. *If the response to the tender consists only of* ***Imported Offers*** (i) The FOB/FCA price shall be the basis of evaluation. **Please make sure that your Price Bid mentions FOB/FCA prices clearly and not just CIF/CIP prices directly OTHERWISE for the purpose of comparison such CIF/CIP price will be taken into account.** (ii) In cases where all the offers are from foreign suppliers, ranking will be assessed on FOB/FCA basis. In the case of goods of foreign origin offered from abroad, customs duty and other similar import duties/taxes, which will be contractually payable (to the tenderer) on the goods, are to be added; (iii) All the foreign quotes will be brought to a common denomination in Indian Rupees by adopting the Selling exchange rate of the RBI/State Bank of India on the date of the opening of Price/financial Bids.

	3. *If the response to the tender consists of Imported as well as Indigenous Offers* (i) The comparison between the indigenous and the foreign offers shall be made on the final landing cost of purchase taking into account, freight, forwarding, insurance, taxes etc. as specified in clause 1(i) and (ii) and for bids in foreign currency as per clause 2 (i), (ii) & (iii) **(ii)** Further, adding advalorem/custom duty/countervailing duty (as applicable) at the rate of 9.34% on price quoted on FOB/FCA term including cost for safe Unloading and all other costs for all activities as per scope of work basis. IIT Delhi will submit Custom Duty Exemption Certificate under clause no.51/96. **(iii)** iGST @ 18% of shipment value & Custom Duty
16.	**Notices:** For the purpose of all notices, the following shall be the address of the Purchaser and Supplier. **Purchaser: Prof. Samaresh Das,** **Centre for Applied Research in Electronics (CARE),** Indian Institute of Technology Hauz Khas, New Delhi - 110016. **Supplier:** (To be filled in by the supplier) **(All suppliers should submit its supplies information as per Annexure-II).** _____ _____
17.	**Progress of Supply**: Wherever applicable, supplier shall regularly intimate progress of supply, in writing, to the Purchaser as under: 1. Quantity offered for inspection and date; 2. Quantity accepted/rejected by inspecting agency and date; 3. Quantity dispatched/delivered to consignees and date; 4. Quantity where incidental services have been satisfactorily completed with date; 5. Quantity where rectification/repair/replacement effected/completed on receipt of any communication from consignee/Purchaser with date; 6. Date of completion of entire Contract including incidental services, if any; and **7.** Date of receipt of entire payments under the Contract (In case of stage-wise inspection, details required may also be specified).
18.	**Inspection and Tests:** Inspection and tests prior to shipment of Goods and at final acceptance are as follows: • After the goods are manufactured and assembled, inspection and testing of the goods shall be carried out at the supplier's plant by the supplier, prior to shipment to check whether the goods are in conformity with the technical specifications attached to the purchase order. Manufacturer's test certificate with data sheet shall be issued to this effect and submitted along with the delivery documents. The purchaser shall be present at the supplier's premises during such inspection and testing if need is felt. The location where the inspection is required to be conducted should be clearly indicated. The supplier shall inform the purchaser about the site preparation, if any, needed for installation of the goods at the purchaser's site at the time of submission of order acceptance. • The acceptance test will be conducted by the Purchaser, their consultant or other such person nominated by the Purchaser at its option after the equipment is installed at purchaser's site in the presence of supplier's representatives. The acceptance will involve trouble free operation and ascertaining conformity with the ordered specifications and quality. There shall not be any additional charges for carrying out acceptance test. No malfunction, partial or complete failure of

	any part of the equipment is expected to occur. The Supplier shall maintain necessary log in respect of the result of the test to establish to the entire satisfaction of the Purchaser, the successful completion of the test specified. • In the event of the ordered item failing to pass the acceptance test, a period not exceeding one weeks will be given to rectify the defects and clear the acceptance test, failing which the Purchaser reserve the right to get the equipment replaced by the Supplier at no extra cost to the Purchaser. • Successful conduct and conclusion of the acceptance test for the installed goods and equipment shall also be the responsibility and at the cost of the Supplier.
19.	**Resolution of Disputes**: The dispute resolution mechanism to be applied pursuant shall be as follows: • In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to the Director, Indian Institute of Technology (IIT) Delhi and if he is unable or unwilling to act, to the sole arbitration of some other person appointed by him willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order. • In the case of a dispute between the purchaser and a Foreign Supplier, the dispute shall be settled by arbitration in accordance with provision of sub-clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules. • The venue of the arbitration shall be the place from where the order is issued.
20.	**Applicable Law:** The place of jurisdiction would be New Delhi (Delhi) INDIA.
21.	**Right to Use Defective Goods** If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the goods proves to be unsatisfactory, the Purchaser shall have the right to continue to operate or use such goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the Purchaser's operation.
22.	**Supplier Integrity** The Supplier is responsible for and obliged to conduct all contracted activities in accordance with the Contract using state of the art methods and economic principles and exercising all means available to achieve the performance specified in the contract.
23.	**Training** The Supplier is required to provide training to the designated Purchaser's technical and end user personnel to enable them to effectively operate the total equipment.
24.	**Installation & Demonstration** The supplier is required to done the installation and demonstration of the equipment within one month of the arrival of materials at the IITD site of installation, otherwise the penalty clause will be the same as per the supply of materials. In case of any mishappening/damage to equipment and supplies during the carriage of supplies from the origin of equipment to the installation site, the supplier has to replace it with new equipment/supplies immediately at his own risk. Supplier will settle his claim with the insurance company as per his convenience. IITD will not be liable to any type of losses in any form.
25.	**Insurance:** For delivery of goods at the purchaser's premises, the insurance shall be obtained by the supplier in an amount equal to 110% of the value of the goods from "warehouse to warehouse" (final destinations) on "All Risks" basis including War Risks and Strikes. The insurance shall be valid for a period of not less than 3 months after installation and commissioning. **In case of orders placed on FOB/FCA/ExW basis, the purchaser shall arrange Insurance. If orders placed on CIF/CIP basis, the insurance should be up to IIT Delhi.**

26.	**Incidental services:** The incidental services also include: • Furnishing of 01 set of detailed operations & maintenance manual. • Arranging the shifting/moving of the item to their location of final installation within IITD premises at the cost of Supplier through their Indian representatives.
27.	**Warranty**: (i) Warranty period shall be (as stated at page #2 of this tender) from date of installation of Goods at the IITD site of installation. The Supplier shall, in addition, comply with the performance and/or consumption guarantees specified under the contract. If for reasons attributable to the Supplier, these guarantees are not attained in whole or in part, the Supplier shall at its discretion make such changes, modifications, and/or additions to the Goods or any part thereof as may be necessary in order to attain the contractual guarantees specified in the Contract at its own cost and expense and to carry out further performance tests. The warranty should be comprehensive on site. (ii) The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall immediately within in 02 days arrange to repair or replace the defective goods or parts thereof free of cost at the ultimate destination. The Supplier shall take over the replaced parts/goods at the time of their replacement. No claim whatsoever shall lie on the Purchaser for the replaced parts/goods thereafter. The period for correction of defects in the warranty period is 02 days. If the supplier having been notified fails to remedy the defects within 02 days, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expenses and without prejudice to any other rights, which the purchaser may have against the supplier under the contract. (iii) The warranty period should be clearly mentioned. The maintenance charges (AMC) under different schemes after the expiry of the warranty should also be mentioned. The comprehensive warranty will commence from the date of the satisfactory installation/commissioning of the equipment against the defect of any manufacturing, workmanship and poor quality of the components. (iv) After the warranty period is over, Annual Maintenance Contract (AMC)/Comprehensive Maintenance Contract (CMC) up to next two years should be started. The AMC/CMC charges will not be included in computing the total cost of the equipment.
28.	**Governing Language** The contract shall be written in English language. English language version of the Contract shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in the same language.
29.	**Applicable Law** The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction.
30.	**Notices** • Any notice given by one party to the other pursuant to this contract/order shall be sent to the other party in writing or by cable, telex, FAX or e mail and confirmed in writing to the other party's address. • A notice shall be effective when delivered or on the notice's effective date, whichever is later.
31.	**Taxes** Suppliers shall be entirely responsible for all taxes, duties, license fees, octroi, road permits, etc., incurred until delivery of the contracted Goods to the Purchaser. However, GST etc, in respect of the transaction between the Purchaser and the Supplier shall be payable extra, if so stipulated in the order.
32.	**Duties** IIT Delhi is exempted from paying custom duty under notification No.51/96 (partially or full) and necessary "Custom Duty Exemption Certificate" can be issued after providing following information

	and Custom Duty Exemption Certificate will be issued to the shipment in the name of the Institute, (no certificate will be issued to third party): The procured product should be used for teaching, scientific and research work only. a) Shipping details i.e. Master Airway Bill No. and House Airway No. (if exists) b) Forwarder details i.e. Name, Contact No., etc.
33.	**Agency Commission**: Agency commission if any will be paid to the Indian agent in Rupees on receipt of the equipment and after satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in Tender even in case of Nil commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent.
34.	**Payment**: (i) For imported items Payment will be made through irrevocable Letter of Credit (LC) Cash Against Documents (CAD)/Against delivery/after satisfactory installation by T.T. Letter of Credit (LC) will be established in favour of foreign Supplier after the submission of performance security. The letter of credit (LC) will be established on the exchange rates as applicable on the date of establishment. For Imports, LC will be opened for 100% FOB/CIF value. 80% of the LC amount shall be released on presentation of complete and clear shipping documents and 20% of the LC amount shall be released after the installation and demonstration of the equipment at the INST site of installation in faultless working condition for period of 60 days from the date of the satisfactory installation and subject to the production of unconditional performance bank guarantee as specified in Clause 8 of tender terms and conditions. (v) For Indigenous supplies, 100% payment shall be made by the Purchaser against delivery, inspection, successful installation, commissioning and acceptance of the equipment at IITD in good condition and to the entire satisfaction of the Purchaser and on production of unconditional performance bank guarantee as specified in Clause 9 of tender terms and conditions. (vi) Indian Agency commission (IAC), if any shall be paid after satisfactory installation & commissioning of the goods at the destination at the exchange rate prevailing on the date of negotiation of LC documents, subject to DGS&D registration for restricted items. (vii) All the bank charges within India will be borne by the Institute and outside India will be borne by the Supplier.
35.	**User list:** Brochure detailing technical specifications and performance, list of industrial and educational establishments where the items enquired have been supplied must be provided. (Ref. Annexure-III)
36.	**Manuals and Drawings** (i) Before the goods and equipment are taken over by the Purchaser, the Supplier shall supply operation and maintenance manuals. These shall be in such details as will enable the Purchaser to operate, maintain, adjust and repair all parts of the works as stated in the specifications. (ii) The Manuals shall be in the ruling language (English) in such form and numbers as stated in the contract. (iii) Unless and otherwise agreed, the goods equipment shall not be considered to be completed for the purposes of taking over until such manuals and drawing have been supplied to the Purchaser.
37.	**Application Specialist**: The Tenderer should mention in the Techno-Commercial bid the availability and names of Application Specialist and Service Engineers in the nearest regional office. (Ref. to Annexure-III)
38.	**Site Preparation**: The supplier shall inform to the Institute about the site preparation, if any, needed for the installation of equipment, immediately after the receipt of the purchase order. The supplier must provide complete details regarding space and all the other infrastructural requirements needed

	for the equipment, which the Institute should arrange before the arrival of the equipment to ensure its timely installation and smooth operation thereafter. The supplier shall visit the Institute and see the site where the equipment is to be installed and may offer his advice and render assistance to the Institute in the preparation of the site and other pre-installation requirements.
39.	**Spare Parts** The Supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier: ii. Such spare parts as the Purchaser may elect to purchase from the Supplier, providing that this election shall not relieve the Supplier of any warranty obligations under the Contract; and iii. In the event of termination of production of the spare parts: iv. Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and v. Following such termination, furnishing at no cost to the Purchaser, the blueprints, drawings and specifications of the spare parts, if requested. Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spares for the Goods, such as gaskets, plugs, washers, belts etc. Other spare parts and components shall be supplied as promptly as possible but in any case within six months of placement of order.
40.	**Defective Equipment**: If any of the equipment supplied by the Tenderer is found to be substandard, refurbished, un-merchantable or not in accordance with the description/specification or otherwise faulty, the committee will have the right to reject the equipment or its part. The prices of such equipment shall be refunded by the Tenderer with 18% interest if such payments for such equipment have already been made. All damaged or unapproved goods shall be returned at suppliers cost and risk and the incidental expenses incurred thereon shall be recovered from the supplier. Defective part in equipment, if found before installation and/or during warranty period, shall be replaced within 45 days on receipt of the intimation from this office at the cost and risk of supplier including all other charges. In case supplier fails to replace above item as per above terms & conditions, IIT Delhi may consider "Banning" the supplier.
41.	**Termination for Default** The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or part: i. If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the order, or within any extension thereof granted by the Purchaser; or ii If the Supplier fails to perform any other obligation(s) under the Contract. iii If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent practices in competing for or in executing the Contract. ● For the purpose of this Clause: i. "**Corrupt practice**" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. ii. "**Fraudulent practice**" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition;'" ● In the event the Purchaser terminates the Contract in whole or in part, the Purchaser may procure, upon such terms and in such manner, as it deems appropriate, Goods or Services similar to those undelivered, and the Supplier shall be liable to the Purchaser for any excess costs for such similar

	Goods or Services. However, the Supplier shall continue the performance of the Contract to the extent not terminated.
42.	**Shifting**: After 1-2 years once our new Academic Block will be ready, the supplier has to shift and reinstall the instrument free of cost (if required).
43.	**Downtime:** During the warranty period not more than 5% downtime will be permissible. For every day exceeding permissible downtime, penalty of 1/365 of the 5% FOB value will be imposed. Downtime will be counted from the date and time of the filing of complaint with in the business hours.
44.	**Training of Personnel:** The supplier shall be required to undertake to provide the technical training to the personnel involved in the use of the equipment at the Institute premises, immediately after completing the installation of the equipment for a minimum period of one week at the supplier's cost.
45.	**Disputes and Jurisdiction**: 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 New Delhi.
46.	**Compliancy certificate**: This certificate must be provided indicating conformity to the technical specifications. (Annexure-I)
47.	**As per Ministry of Finance, Deptt. of Expenditure, Public Procurement Division Order (Public Procurement No.1) issued from file No.6/18/2019-PPD dated 23rd July, 2020** regarding Restrictions under Rule 144 (xi) of the General Financial Rules (GFRs) 2017, it is directed that any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the Competent Authority i.e. the Deptt. for Promotion of Industry and Internal Trade (DPIIT). *The said order will not apply to bidders from those countries (even sharing a land border with India) to which the Government of India has extended lines of credit or in which the Government of India is engaged in development projects (updated lists of the countries are given in the Ministry of External Affairs)* "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participated in a procurement process. "Bidders from a country which shares a land border with India" for the purpose of this Order means: i. An entity incorporated, established or registered in such a country; or ii. A subsidiary of an entity incorporated, established or registered in such a country; or ii. An entity substantially controlled through entities incorporated, established or registered in such a country; or *v.* An entity whose *beneficial owner* is situated in such a country; or *v.* An Indian (or other) agent of such an entity; or *vi.* A natural person who is the citizen of such a country; or *ii.* A consortium or joint venture where any member of the consortium or joint venture falls under any of the above The *beneficial owner* for the purpose of above will be as under: - 1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person (s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercise control through other means. Explanation-

	a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of share or capital or profit of the company; b. "Control" shall include the right to appoint majority of the directors or to control the management of policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements; 2. In case of a partnership firm, the beneficial owner is the natural person (s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership; 3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person (s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals; 4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official; 5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership. An agent is a person employed to do any act for another, or to represent another in dealings with the third person. For Works contracts, including Turnkey contracts, the successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority. **A certificate shall be submitted by bidders in the tender documents regarding their compliance with the said order**. If the certificate submitted by a bidder whose bid is accepted is found to be false, this would be a ground for immediate termination and further legal action in accordance with law. Annexure VI (For Goods/ Services contracts)/ *Annexure VII (For Works contracts, including Turnkey contracts)*

(ANNEXURE-I)

COMPLIANCE SHEET

TECHNICAL SPECIFICATION

1. This procurement consists of Semiconducting Qubit Measurement and Control System with DAC, Arbitrary waveform generator, Vector signal generator, Quantum board, Qbox, RF components and other optional items.
2. All the above-mentioned items of the Semiconducting Qubit Measurement and Control System are required to function as a single integrated setup and hence must be compatible with each other in terms of synchronization of applied voltage, demodulation of readout signals, connector compatibility, and device-level performance. Specifically,

- The **Digital to Analogue Converter** (DAC), **Qbox**, and **QFilter** must be compatible with each other to supply low-noise DC voltages to the gates and reservoirs of gate-defined quantum dot devices. When installed on the dilution refrigerator, the system shall allow an electron temperature of no more than 50 mK above the base temperature (~10 mK).
- The **Arbitrary Waveform Generator** (AWG), **Vector Signal Generator** (VSG) and the **Digital to Analogue Converter** (DAC) shall be mutually compatible so that they can be used together to perform fast tuning of quantum dot devices through two-dimensional gate-gate (charge stability) scans, with one gate voltage swept rapidly by the AWG and the other stepped by the DAC.
- The system shall be controllable from a single software environment so that DAC voltage stepping and AWG, VSG sweeps are synchronized within one program.

3. A declaration on company letterhead regarding these compatibility requirements from the bidders will be mandatory at the time of bid submission. Please provide a declaration with technical details of the compatibility between all the items.
4. The technical evaluation will be based on technical specs as well as the compatibility between different items.
5. Vendor should include all the required accessories to run the full system as per tender specification capability
6. The financial L1 will be decided based on the combined price of full system.

Parameter	**Specification**	**Compliance (Y/N)**
Digital to Analog Converter		
Number of independent channels	24	
Voltage	±10 V and ±2 V, Should be able to configure for each channel separately	
DC Voltage resolution	25 bits or better	
Current output	10 mA or better	
Current sensing	Every channel should be able to measure the sourcing/leakage current independently with a Current resolution of 20 pA or lower	
Output impedance	50 Ohms	
Output filter	Selectable, with a minimum cut off 10 Hz, and maximum cut off of 300 kHz for each output channel	
Voltage Stability	±2 μV for over 40 hours	

Voltage noise floor	10 $nV/Hz^{1/2}$ or lower at 100 Hz	
Sample rate	1 MHz or better	
Rise time	5 µs or shorter	
Available waveforms on each channel	Sine, Square, Triangle.	
Output frequency	DC to 250 kHz or higher	
Waveform generator	One/channel	
Computer interfacing, Control and automation	Should have LAN and USB interfaces. Should be able to control and automate using QCodes.	
Trigger options	Should have isolated trigger options for input and output	
Power requirements	Should operate on standard single-phase power outlets in the country. The offer should include any power adapters required to operate the unit.	
Formfactor	19-inch rack-mountable.	
Cable requirement	Fischer cable, 1 flange, 3m Cable Fischer (male) to Fischer (male), 24 channel, double shielded twisted pairs, one flange, 3 meters which connects to cryostat should be provided.	
Quantity	Two	
Warranty	One-year warranty from the date of successful installation/commissioning of equipment.	
Arbitrary Waveform Generator, Vector Signal Generator		
Low frequency output channel characteristics	All channels should be phase and time synchronous	
	Each low-frequency control must have at least 8 analog independent output channels, each capable of producing microwave pulses to drive magnetic flux in the qubit or coupler in the range DC – 750 MHz or wider.	
	DAC sampling rate: 2 GSa/s or higher	
	DAC Vertical resolution: 16-bit or higher	

	Bandwidth: DC – 750 MHz or wider.	
	Number of Digital outputs: at least 1 per output channel or more.	
	Rise time < 500 ps @ 0.8 Vpp step	
	Voltage range: 1 Vpp or wider.	
	Voltage noise: 10 nV/sqrt (Hz) at 100 kHz measured for 1 Vpp	
	Phase noise: -145 dBc/Hz or less (at 100 MHz with 10 kHz offset).	
	Total harmonic distortion: 65 dBc or higher.	
	Spurious free dynamic range (SFDR): 55 dBc or higher (within the entire frequency range and without any external filtration).	
	All channels must be synchronized by 2 GHz reference clock	
	Must contain finite impulse response (FIR) filters and infinite impulse response (IIR) filters that are both implemented in FPGA logic.	
	Quantity- Two	
	One year warranty should be available	
Low frequency Input channel characteristics	Each low-frequency control module must have at least 2 analog independent input channels, with capability to demodulate and digitize measurement signals with carrier frequencies in the range 0 – 750 MHz or wider.	
	Each input channel can digitize incoming microwave pulses with 8 multiplexed signals, and independently process each signal.	
	Digitizer sampling rate: 2 GSa/s for each channel or higher, ADC vertical resolution: 12-bit or higher.	
	Bandwidth: DC – 750 MHz or wider.	
	Input impedance: 50 Ohm. Input channel type: SMA.	
High frequency output channel characteristics	Each high-frequency control module must have at least 8 analog independent output channels, each capable of generating	

	arbitrarily shaped microwave pulses to drive qubits or probe readout resonators with frequency in the range 0.05 – 10.5 GHz or wider.	
	Signal generation needs to be based on pure direct digital synthesis (DDS) technology for all frequencies up to 10.5GHz, without requiring any analog frequency upconversion stages (e.g., analog mixers).	
	The integrated system must have digital-to-analog converters (DACs) for qubit control. Vertical resolution: 16-bit or higher.	
	Waveform sampling rate: minimum 2 GSa/s (1 GSa/s for each quadrature)	
	Realtime Bandwidth: 800 MHz	
	Output impedance: 50 Ohm. Output channel type: SMA	
	Allows to frequency multiplex tones within a span of at least 2GHz with no analog combiners and/or analog mixers.	
	Number of Digital outputs: at least 1 per output channel or more.	
	Full scale output power range from -11 to +16 dBm or wider.	
	Phase noise: -125 dBc/Hz at 6 GHz, 10 kHz offset or better	
	Worst harmonic component: 40 dBc or higher at 0 dBm.	
	Spurious free dynamic range (SFDR): 75 dBc or higher at 0 dBm (within the whole frequency range and without any external filtration or calibration need).	
	The SFDR spec value must be specified for at least 1 GHz band around the carrier.	
	SFDR spec value must be seamlessly attained, without any external filtering and with no calibration.	
	The integrated system must provide control of the absolute phase of the RF carrier for each output channel.	

	Direct Phase setting capabilities for the RF carrier.	
	8 complex cores FPGA-based pulse processor	
	Quantity- One	
	One year or more warranty should be available	
High frequency Input channel characteristics	The high-frequency control module must have at least 2 analog independent input channels, with capability to downconvert and digitize measurement signals with carrier frequencies in the range 1.8 – 10.5 GHz or wider.	
	Each input channel can digitize incoming microwave pulses with 8 multiplexed signals and independently process each signal.	
	Hardware should be capable to support input sampling rate of 1GSa/s.	
	Realtime Bandwidth: 800 MHz or wider	
	Input impedance: 50 Ohm. Input channel type: SMA. Input power ranges from -40 to -10 dBm or wider.	
Reference clock	The integrated device must have an input for an external frequency reference. It must support at least a standard 2 GHz clock.	
Power line	The instrument should be compatible with the standard Indian power line (supply)	
Markers	For sending marker and trigger signals, the integrated device must have at least one digital output channel per each analog RF output.	
Rack compatibility	All the independent input and output channels should be distributed in one 19-inch rack-mountable unit	
Operational Requirements	The integrated device must be capable of fully parametric waveform generation, waveform acquisition, real-time processing and control flow.	
	The integrated device must be able to output conditional execution of both microwave	

	pulse and baseband pulse based on analog measurement outcome followed by signal demodulation and integration, with feedback latency ≤200.	
	The integrated device must support the following operational latencies: Amplitude update < 16 ns, Phase update < 32 ns, Frequency update < 150 ns.	
	The integrated device must be capable of performing real-time analog feedback. The parameters of output pulses or continuous signals must be adjustable based on measured signals (or an arbitrary calculation performed on the input signals), without uploading an entirely new pulse waveform to the integrated device.	
	The integrated device must support real-time modulation of all pulse parameters including envelope, amplitude, phase, frequency, duration and offsets.	
	The integrated device must support real-time phase randomization for dynamical decoupling sequences.	
	The integrated device must support pre-processing of data (i.e. averaging) before sending it to the host PC.	
	The integrated device must support parallel and non-exclusive streaming of both the raw ADC traces and I, Q data.	
	The integrated device must allow the arbitrary control of sweep parameters utilizing FPGA -based (or equivalent) control to perform parameter sweeps without time overhead, including parallel sweeping of multiple parameters.	
	The integrated device must allow extensive control flow, including if/else, for, while, switch statements, conditional plays, nested loops.	
	The integrated device must support programming new custom sequences, with access to FPGA (or equivalent) logic, including conditional statements, without need to implement or understand low-level programming.	

	The integrated device must allow for adaptive automatic experiment termination based on arbitrary logic performed on running analysis results.	
	The integrated device must support running typical subroutines such as active qubit reset or mid-experiment frequency tracking on arbitrary sequences.	
	The integrated device must contain comprehensive library of hardware optimized mathematical functions implementable on the FPGA (or equivalent), including multiplication, division, log, exp, sqrt, without the need of low-level programming.	
	The integrated device must allow the ability to switch frequency and return by maintaining phase coherence.	
	The digital output channels are synchronized with the analog outputs.	
	The integrated device must either be capable of calibration-free operation, or any required calibration of up- and down-conversion mixers for the high frequency control in the integrated device must be fully automatic and transparent to the user.	
	The integrated device must support real-time, dynamic updates to the running quantum sequence based on data received from the classical accelerator without requiring any pausing or recompilation of the program.	
Software & Control	Remote programming of each channel from a computer, via a single communication channel, which can be USB or Ethernet, should be provided.	
	Must be compatible with QCodes	
	The integrated device must be controllable via pulse-level language compatible with Python API and with real-time processing. Comprehensive API documentation must be provided, including programming examples. The integrated device should be easy to install and program.	

	If the software or part of the software required to control the integrated device is not open source, the license must allow installing and using the control software on multiple computers. It must not be tied to a single control computer.	
	Any future upgrade in the firmware should be provided free of cost.	
Warranty	One-year warranty from the date of successful installation/commissioning of equipment.	
QBox (Breakout box)		
Connector interface	Fischer connector (both input and output), BNC connectors (input)	
Channel count	Minimum of 24 independent input signal channels per unit	
Shielding	Fully shielded metallic enclosure maintaining continuous electromagnetic shielding (Faraday cage) from the input to the output	
Control options	The breakout box should be able to connect 24 low-frequency channels to either a DAC channel, a ground, or leave them floating remotely, using commands sent from a computer.	
	The automated breakout box should be able to connect any of 24 low-frequency channels to at least 8 other instruments through a switch matrix operated by commands sent over ethernet	
	Cable Fischer (male) to Fischer (male), 24 channel, double shielded twisted pairs, one flange, 3 meters which connects to cryostat should be provided.	
	The relays of the automated breakout box should be switchable within 100 ms.	
Electrical performance	Low contact resistance and high insulation resistance between channels. • Minimal channel-to-channel crosstalk. • Suitable for precision DC and low-frequency measurements.	
Rack compatibility	19" rack mountable	
Wiring	Low-noise wiring (e.g., twisted pairs) suitable for sensitive DC measurements	

Documentation	Complete pinout diagram and wiring documentation need to be provided	
Quantity	Automated breakout box with fischer cables having quantity Two and Two quantities of power plug should be provided	
Warranty	One-year warranty from the date of successful installation/commissioning of equipment.	
Quantum Board		
Quantum board specifications	Prototype hardware will not be considered. The supplier must demonstrate the delivery of > 10 systems within the last year.	
	Demonstrated simultaneous operation of multiple spin qubits	
	Modular system capable of handling signal delivery from at least 48 DC lines and at least 16 RF lines with integrated bias tees as RC filters with option for backgating the chip cavity back-plane	
	Spring contacting interposer between connectorized main board and chip-carrying daughterboard for signal handling up to 8 GHz	
	Exchangeable daughterboards for handling hundreds of different samples without disposing of connectors or interposers	
	SMT component placeholders for at least four LC tank circuits	
	Non-magnetic design with no nickel plating of circuit boards or interposer spring contacts	
	Signal integrity of combined DC and RF lines through bias tees, interposer and wire bonding up to 8 GHz	
	All components for the connection of Quantum board to dilution refrigerator and for sample placement should be provided.	
	Form factor for vertical and horizontal mounting in bottom loaders fitting within 60 mm diameter with 45 mm rail spacing (Bluefors BF60 or BF80).	
	Quantum board quantity-one	

	a) Daughterboard with sample space 10x10mm; quantity-20 b) Daughterboard, 6x6mm with tank circuits; quantity-5 c) Daughterboard, 10x10mm with tank circuits; quantity-10	
RF components		
Filter	At least 24 channels low pass filter with 2 stage RC and RF filters	
Filtering spec	3 dB attenuation at 65 kHz At least 60 dB attenuation at 50 MHz	
Channel Isolation	More than 5 Gohm isolation per channel	
Connectors	Micro-D connectors for input and output	
Casing	Non-magnetic gold-plated copper	
Temperature Compatibility	Compatible at cryogenic temperatures – mountable on the mixing chamber plate of a dilution refrigerator	
Cable requirement	Jumper cable, 6 inches, 25-pin microD male to female should be provided	
Quantity	Filter box Quantity- two; 6 inch jumper cable quantity- two	
Optional items		
Cables and adapters	All adapters, connectors and cables needed for the connection of control electronics to dilution refrigerator and for the full operation of device both DC and RF measurements should be provided	

I have also enclosed all relevant documents in support of my claims, (as above) on the following pages.

Signature of Bidder

Name: _____

Designation: _____

Organization Name: _____

Contact No. : _____

(ANNEXURE-II)

<< Organization Letter Head >>
DECLARATION SHEET

We, _____ hereby certify that all the information and data furnished by our organization with regard to this tender specification are true and complete to the best of our knowledge. I have gone through the specification, conditions and stipulations in details and agree to comply with the requirements and intent of specification.

This is certified that our organization has been authorized (Copy attached) by the OEM to participate in Tender. We further certified that our organization meets all the conditions of eligibility criteria laid down in this tender document. Moreover, OEM has agreed to support on regular basis with technology / product updates and extend support for the warranty.

The prices quoted in the financial bids are subsidized due to academic discount given to IIT Delhi.

We, further specifically certify that our organization has not been Black Listed/De Listed or put to any Holiday by any Institutional Agency/ Govt. Department/ Public Sector Undertaking in the last three years.	NAME & ADDRESS OF THE Vendor/ Manufacturer / Agent
1 Phone	
2 Fax	
3 E-mail	
4 Contact Person Name	
5 Mobile Number	
6 GST Number	
7 PAN Number	
(In case of on-line payment of Tender Fees) 8 UTR No. (For Tender Fee)	
(In case of on-line payment of EMD) 9 UTR No. (For EMD)	
10 Kindly provide bank details of the bidder in the following format: a) Name of the Bank	
b) Account Number	
c) Kindly attach scanned copy of one Cheque book page to enable us to return the EMD to unsuccessful bidder	

(Signature of the Tenderer)

Name:

Seal of the Company

(ANNEXURE-III)

List of Govt. Organization/Deptt.

List of Government Organizations for whom the Bidder has undertaken such work during last three years (must be supported with work orders)		
Name of the organization	**Name of Contact Person**	**Contact No.**

Name of application specialist / Service Engineer who have the technical competency to handle and support the quoted product during the warranty period.		
Name of the organization	**Name of Contact Person**	**Contact No.**

Signature of Bidder

Name: _____

Designation: _____

Organization Name: _____

Contact No. : _____

PREVIOUS SUPPLY ORDER DETAILS

(ANNEXURE – IV)

Name of the Firm_____

Order placed by (Full address of Purchaser)	Order No. and Date	Description and quantity of order equipment	Value of order	Date of Completion of delivery as per contract	Has the equipment been installed satisfactorily (Attach a Certificate from the Purchaser/ Consignee)	Contact person along with Telephone No., Fax No. and email address)

Signature and Seal of the Manufacturer/ Bidder

_____

Place: _____

Date: _____

(ANNEXURE-V)

ORIGINAL EQUIPMENT MANUFACTURER (OEM)
Manufacturing authorisation form (MAF)
(On Letter Head of Manufacturer)

Tender No. :- …… Date:- ……..

To
The Director,
Indian Institute of Technology Delhi,
New Delhi- 110016

Dear Sir,

We manufactures of original equipment at (……..address of factory……) do hereby authorize M/s *(Name and address of Agent)* to submit a bid, negotiate and receive the order format against your tender enquiry.

M/s. …….. is authorized to bid and conclude the contract in regard to this business.

We hereby extend our full guarantee and warranty as per clause …… of the terms and conditions NIQ for the goods and services offered by the above firm.

Yours Faithfully,

(Name)

(Name & Seal of Manufactures)

Note: -

1. **Items of indigenous nature or quoted in INR**, more than 1 authorized representative may participate in the same tender and submit their bids on behalf of their OEM/Principal/Manufacturer if the OEM permits more than one authorized bidder in such case as per their policy.

2. **In cases of agents quoting in offshore procurements,** on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. **One manufacturer can also authorize only one agent/dealer**

3. The letter of authority should be on the letterhead of the manufacturer and should be signed by a person competent and having the power of attorney to bind the manufacturer. The same should be included by the bidder in its techno-commercial unpriced bid.

<On Organization Letter Head>

(ANNEXURE-VI)

(For Goods/ Services Contracts)

No._____ Dated:_____

CERTIFICATE

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 this bidder is 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 this bidder is from _____(*Name of Country*) and has been registered with the Competent Authority. I also certify that this bidder fulfills 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)

Signature of Bidder/ Agent

Name: _____

Designation: _____

Organization Name: _____

Contact No. : _____

<On Organization Letter Head>

(ANNEXURE-VII)

(For Works Contracts, including Turnkey contracts)

No._____ Dated:_____

CERTIFICATE

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries and hereby certify that this bidder is not from such a country and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority.

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 on sub-contracting to contractors from such countries and hereby certify that this bidder is from _____(*Name of Country*) and has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I also certify that this bidder fulfills 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)

Signature of Bidder/ Agent

Name: _____

Designation: _____

Organization Name: _____

Contact No. : _____

(ANNEXURE-VIII)

BID SECURITY UNDERTAKING

(To be issued by the bidder on company's letterhead in lieu of EMD)

To,

The Registrar,
I.I.T. Delhi, Hauz Khas,
Delhi – 110016.

We, M/s _____ (Name of the Firm), with ref. to Tender No._____ dated_____ hereby undertake that:

1. We accept all terms and conditions of the tender document.
2. We accept that, we will not modify our bid during the bid validity period and will honour the contract after the award of contract.
3. In the event of any modification to our bid by us or failure on our part to honour the contract after final award, our firm may be debarred from participation in any tender/ contract notified by IIT Delhi for a period of one year.

Yours faithfully,

(signature)

Name:

Date:

Office Seal:

BID SUBMISSION

Online Bid Submission:

The Online bids (complete in all respect) must be uploaded online in **two** Envelops as explained below: -

Envelope – 1 (Following documents to be provided as single PDF file)			
Sl. No.	**Document**	**Content**	**File Types**
1.	Technical Bid	Compliance Sheet (Annexure - I)	.PDF
2.		Organization Declaration (Annexure - II)	.PDF
3.		List of organizations/ clients where the same products have been supplied (in last two years) along with their contact number(s). (Annexure-III)	.PDF
4.		Technical supporting documents in support of all claims made at Annexure-I	.PDF
5.		Previous Supply Order (Annexure - IV)	.PDF
6.		Original Equipment Manufacturing Manufacturing Authorization Form (MAF) (Annexure - V)	.PDF
7.		*(For Goods/ Services Contracts)* Certificate - Bidder Not from/ from Country sharing Land border with India & Registration of Bidder with Competent Authority (Annexure-VI)	.PDF
8.		*(For Works Contracts, including Turnkey Contracts)* Certificate – Bidder Not from/ from Country sharing Land border with India, Registration of Bidder with Competent Authority & not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority (Annexure-VII)	.PDF
9.		Bid Security Undertaking in lieu of EMD (Annexure-VIII)	.PDF
Envelope – 2			
Sl. No.	**Document**	**Content**	
1.	Financial Bid	Price bid should be submitted in given BOQ_XXXX.xls format. (***Note: -Comparison of prices will be done ONLY on the bids submitted for the Main Equipment and anything asked as 'Optional' in the specs is not to be included for overall comparison.)*** Bids for optional items are to be submitted in 'sheet2_Quote for optional items'	.XLS