

Domestic Tender

This is a Request for Quote (RFQ) from the Indian Institute of Science (IISc), Bangalore for the supply and installation of high-speed control electronics for a multi-qubit quantum processor

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Section 1 - Bid Schedule

1	Tender No	PPH/VBSI/25-26/604
2	Tender Date	24.09.2025
3	Item Description	High-speed control electronics for a multi-qubit quantum processor
4	Tender Type	Two bid system (i) Technical Bid (Part A) (ii) Commercial Bid (Part B)
5	Place of tender submission	Chairperson, Department Of Physics Indian Institute of Science, Bangalore 560012 Attention: Dr. Vibhor Singh
6	Last Date & Time for submission of tender	5.30 pm, 15.10.2025
7	For further clarification	Dr. Vibhor Singh Department of Physics, Indian Institute of Science, vsingh@iisc.ac.in Ph: 080 2293 2481

Section 2 – Eligibility Criteria

Prequalification criteria:

1. The Bidder's firm should have existence for a minimum of 5 years. (Enclose Company Registration Certificate)
2. The Bidder should belong to either class 1 or class 2 supplier distinguished by their "local content" as defined by recent edits to GFR. They should mention clearly which class they belong to in the cover letter.
 - a) **Class 1 supplier:** Goods and services should have local content of equal to or more than 50%.
 - b) **Class 2 supplier:** Goods and services should have local content of equal to or more than 20% and less than 50%.
3. Purchase preference as defined by the recent edits to GFR (within the "margin of purchase preference") will be given to Class-1 supplier.
4. Quote should come only from Indian Original Equipment Manufacturer (OEM) or their Indian authorized distributor.
5. The quotations should be on FOR-IISc Bangalore basis in INR only.
6. MSME can seek exemption to some qualification criteria. IISc follows GFR2017 for such details
7. The bidder should sign and submit the declaration for Acceptance of Terms and Conditions as per -Annexure 4.
8. The Bidder must not be blacklisted/banned/suspended or have a record of any service- related dispute with any organization in India or elsewhere. A declaration to this effect must be given as per Annexure 3.
9. Bidders offering imported products will fall under the category of non-local suppliers. They cannot claim themselves as class-1 local suppliers/ class-2 local suppliers by claiming services such as transportation, insurance, installation, commissioning, training and other sales service support like AMC/CMC, etc., as local value addition.

Section 3 – Terms and Conditions

A) Submission of Tender:

1. All documentations in the tender should be in English.
2. Tender should be submitted in two envelopes (two bid system).
 - a. Technical Bid (Part-A) – Technical bid consisting of all technical details and check list for conformance to technical specifications.

The technical proposal should contain a technical compliance table with 5 columns.

- i. The first column must list the technical requirements, in order that they are given in the technical requirements in section-4 below.
- ii. The second column should provide specifications of the instrument against the requirement. Please provide quantitative responses wherever possible.
- iii. The third column should describe your compliance with a “Yes” or “No” only. Ensure that the entries in column 2 and column 3 are consistent.
- iv. The fourth column should state the reasons/explanations/context for deviations, if any.
- v. The fifth column can contain additional remarks from the OEM. You can use this opportunity to highlight technical features, qualify response of previous columns, or provide additional details, compare your solution with that of your competitors or provide details as requested in the technical requirements table below.

- b. Commercial Bid (Part-B) – Indicating item wise price for the items mentioned in the technical bid, **as per the format of quotation provided in tender**, and other commercial terms and conditions.
3. The technical bid and price bid should each be placed in separate sealed covers, superscripting on both the envelopes the tender no. and the due date. Both these sealed covers are to be placed in a bigger cover which should also be sealed and duly superscripted with the Tender No, Tender Description & Due Date.
4. The SEALED COVER superscripting tender number / due date & should reach Chairperson, Department of Physics, Indian Institute of Science, Bangalore – 560012, India on or before due date mentioned in the tender notice. In case the due date happens to be holiday the tender will be accepted and opened on the next working day. If the quotation cover is not sealed, it will be rejected.
5. All queries are to be addressed to the person identified in “Section 1 – Bid Schedule” of the tender notice.

6. GST/other taxes, levies etc., are to be indicated separately. The BIDDER should mention GST Registration and PAN in the tender document (Indian Bidders only).
7. If price is not quoted in Commercial Bid as per the format provided in tender document the bid is liable to be rejected.
8. The Institute reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time prior to the award of contract, without there by incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders.
9. Incomplete bids will be summarily rejected.

B) Cancellation of Tender:

Notwithstanding anything specified in this tender document, the purchase committee, IISc Bangalore, in its sole discretion, unconditionally and without having to assign any reason, reserves the rights:

- a. To accept OR reject lowest tender or any other tender or all the tenders.
- b. To accept any tender in full or in part.
- c. To reject the tender, offer not confirming to the tender terms.

C) Validity of the Offer:

The offer shall be valid 90 Days from the date of opening of the commercial bid.

D) Evaluation of Offer:

1. The technical bid (Part A) will be opened first and evaluated.
2. Bidders meeting the required eligibility criteria as stated in Section 2 of this document shall only be considered for Commercial Bid (Part B) opening. Further, agencies not furnishing the documentary evidence as required will not be considered.
3. Pre- qualification of the bidders shall not imply final acceptance of the Commercial Bid. The agency may be rejected at any point during technical evaluation or during commercial evaluation. The decision in regard to acceptance and / or rejection of any offer in part or full shall be the sole discretion of IISc Bangalore, and decision in this regard shall be binding on the bidders.
4. The award of contract will be subject to acceptance of the terms and conditions stated in this tender.
5. Any offer which deviates from the vital conditions (as illustrated below) of the tender is liable to be rejected:

- a. Non-submission of complete offers.
 - b. Receipt of bids after due date and time and or by email / fax (unless specified otherwise).
 - c. Receipt of bids in open conditions.
6. In case any BIDDER is silent on any clauses mentioned in these tender documents, IISc Bangalore shall construe that the BIDDER had accepted the clauses as of the tender and no further claim will be entertained.
7. No revision in the terms and conditions quoted in the offer will be entertained after the last date and time fixed for receipt of tenders.
8. Lowest bid will be calculated based on the total price of all items tendered for Basic equipment along with accessories selected for installation, operation, preprocessing and post processing, optional items, recommended spares, warranty, annual maintenance contract. Also see section G.

E) Pre-requisites:

The bidder will provide the prerequisite installation requirement of the equipment along with the technical bid.

F) Warranty:

The complete system is to be under warranty period of minimum 1 year (year wise breakup value should be shown in the commercial bid) including free supply of consumables, spare parts and data analysis software from the date of functional installation. If the instrument is found to be defective, it must be replaced or rectified at the cost of the bidder within 30 days from the date of receipt of written communications from IISc, Bangalore. If there is any delay in replacement or rectification, the warranty period should be correspondingly extended.

G) Annual Maintenance Contract:

An annual maintenance contract for a period of at least 2 years post warranty should be provided on completion of the warranty period. If the equipment cost is A, AMC is B, the lowest bid will be calculated as $L1 = A + 5 \times B$.

H) Purchase Order:

1. The order will be placed on the bidder whose bid is accepted by IISc based on the terms & conditions mentioned in the tender document.
2. The quantity of the items in tender is only indicative. IISc, Bangalore reserves the right to increase /decrease the quantity of the items depending on the requirement.

3. If the quality of the product and service provided is not found satisfactory, IISc, Bangalore reserves the right to cancel or amend the contract.

I) Delivery, Installation and Training:

The bidder shall provide the lead time to delivery, installation and made functional at IISc, Bangalore from the date of receipt of purchase order. The system should be delivered, installed and made functional within 3 **months** from the date of receipt of purchase order. The supply of the items will be considered as effected only on satisfactory installation and inspection of the system and inspection of all the items and features/capabilities tested by the IISc, Bangalore. After successful installation and inspection, the date of taking over of entire system by the IISc, Bangalore shall be taken as the start of the warranty period. No partial shipment is allowed. The bidder should also arrange for technical training to the local facility technologists and users.

J) Payment Terms:

The payments to non-domestic vendors will be through a Letter of Credit and milestone of the payment will be determined after the mutual discussions with the successful bidder. As per GFR no advance payment can be made to domestic vendors, unless an equal amount of bank guarantee is provided.

K) Statutory Variation:

Any statutory increase in the taxes and duties subsequent to bidder's offer, if it takes place within the original contractual delivery date, will be borne by IISc, Bangalore subject to the claim being supported by documentary evidence. However, if any decrease takes place the advantage will have to be passed on to IISc, Bangalore.

L) 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 the city of Bangalore, India.

M) General:

1. All amendments, time extension, clarifications etc., within the period of submission of the tender will be communicated electronically. No extension in the bid due date/time shall be considered on account of delay in receipt of any document(s) by mail.
2. The bidder may furnish any additional information, which is necessary to establish capabilities to successfully complete the envisaged work. It is however, advised not to furnish superfluous information.

3. The bidder may visit the installation site before submission of tender, with prior intimation.
4. All imported equipment should be quoted in the currency of the country of origin, and all locally sourced items should be quoted in Indian Rupees.
5. Any information furnished by the bidder found to be incorrect, either immediately or at a later date, would render the bidder liable to be debarred from tendering/taking up of work in IISc, Bangalore.

Section 4 – Technical specifications

The requirements of the control electronics for a multi-qubit quantum processor have been broken down into following different sections: (i) High frequency Input channel configuration (ii) High frequency Output channel configuration, (iii) Low frequency output channel configuration, (iv) Software, and (v) General specifications.

(i) High frequency **input** channel configuration:

SN	Specification	values
1.	Total number of analog channels required (readout analysis)	8
2.	Frequency range (each channel)	2 GHZ – 8.5 GHZ
3.	Simultaneous, frequency-multiplexed readout of qubits (each channel)	At least 8 qubits
4.	Instantaneous Bandwidth	750 MHz or wider
5.	A/D conversion	12-bit resolution or better
6.	Input power range	-40 dBm to -10 dBm or wider
7.	Input impedance	50 Ohm
8.	Input channel type	SMA-F
9.	Sampling rate	1 GSPS per I/Q quadrature or better

(ii) High frequency **output** channels configuration:

SN	Specification	values
1.	Total number of analog channels required (control +readout generation)	40 (or more)
2.	Frequency range (each channel)	2GHZ – 8.5 GHZ
3.	Arbitrarily shaped microwave pulses	Yes
4.	Instantaneous Bandwidth	800 MHz or wider
5.	D/A conversion; Vertical resolution	14-bit
6.	Waveform sampling rate	1 GSPS or more for each I/Q quadrature
7.	Number of Digital outputs	1 or more
8.	Max output power range	+10 dBm or more
9.	Output impedance	50 Ohm
10.	Output channel type	SMA-F
11.	CW operation parameters	
12.	Phase noise	< -110 dBc/Hz at 5 GHz, 10 kHz offset < -138 dBc/Hz at 5 GHz, 10 MHz offset
13.	Worst harmonic component	40 dBc or higher at 0 dBm
14.	Spurious free dynamic range (SFDR)	48 dBc or higher at 0 dBm

(iii) Low-frequency **output** channel configuration:

SN	Specification	values
1.	Total number of analog channels required	40 (or more)
2.	Frequency range (each channel)	DC-500MHz or wider
3.	Arbitrarily shaped microwave pulses	Yes
4.	D/A conversion; Vertical resolution	16-bit
5.	Waveform sampling rate	1 GSPS or more for each quadrature
6.	Number of Digital outputs	1 or more
7.	Voltage range:	4 Vpp or larger.

8.	Output impedance	50 Ohm
9.	Output channel type	SMA-F
10.	CW parameters	
11.	Phase noise	-135 dBc/Hz at 100 MHz with 10 kHz offset
12.	Worst harmonic component	60 dBc for 4 dBm range
13.	Spurious free dynamic range (SFDR)	75 dBc
14.	Voltage noise	12 nV/sqrt(Hz) > 200 kHz, into high impedance

(iv) Software:

1. The 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 Device should be easy to install and program.
2. The Device must allow the possibility of programming new custom sequences, with access to FPGA logic, including conditional statements, without need to implement or understand low-level FPGA-based programming
3. If the software or part of the software required to control the 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. The license must include software updates for at least 5 years.
4. Open-source Qubit calibration software with visual must be included without extra cost.

(v) General specifications:

1. Due to complexity of the project, the supplier must have track record of supplying control electronics for at least 10 superconducting quantum computing systems (at least 5 qubits size) in the last two years.
2. The device must be able to control superconducting qubits with measurement-based feedback control.
3. The device must be based on a scalable and modular architecture with large number of channel count, and synchronization between all the channels, low latency between input and output channels.
4. Standard operation of the Device must not require any external MW hardware such as mixers, couplers, splitters, signal generators, switches, or spectrum analyzers.
5. The Device must be in a form factor that fits into a standard 19" rack. Rack mounting hardware (rails, handles etc.) should be included with the Device.
6. The Device architecture must integrate a classical processor directly with the analog front-end to enable parametric waveform generation, waveform acquisition, data processing and control flow on the hardware.
7. The device architecture must ensure high density of control channels for the measurement system with low feedback latency, which must be measured with last sample in and first sample out. Feedback latency is below 360 ns within one instrument or module, and 550 ns between any module. Skew < 200ps.

A. Training and demonstration

Training on usage of the machine (hardware and software) must be demonstrated by the successful bidder at bidder's cost to the end users at IISc, Bangalore.

Section 5 - Technical Bid

The technical bid should furnish all requirements of the tender along with all annexures in this section and be submitted to

The Chairperson,
Attn: Dr. Vibhor Singh
Department of Physics
Indian Institute of Science
Bangalore – 560012, India

Annexure-1:

Details of the Bidder

The bidder must provide the following mandatory information & attach supporting documents wherever mentioned:

Details of the Bidder

Sl. No	Items	Details
1.	Name of the Bidder	
2.	Nature of Bidder (Attach attested copy of Certificate of Incorporation/ Partnership Deed)	
3.	Registration No/ Trade License, (attach attested copy)	
4.	Registered Office Address	
5.	Address for communication	
6.	Contact person- Name and Designation	
7.	Telephone No	
8.	Email ID	
9.	Website	
10.	PAN No. (attach copy)	
11.	GST No. (attach copy)	

Signature of the Bidder

Name
Designation, Seal

Date:

Annexure-2:

Declaration regarding experience

To,
The Chairperson,
Department of Physics,
Indian Institute of Science,
Bangalore – 560012, India

Ref: Tender No: XXXXXXXXXX
Dated: XXXXX

Supply and installation of _____ to Department of Physics, IISc Bangalore.

Sir,

I've carefully gone through the Terms & Conditions contained in the above referred tender. I hereby declare that my company / firm has----- years of experience in supplying and installing _____.

(Signature of the Bidder)
Printed Name
Designation, Seal Date:

Annexure-3:

Declaration regarding track record

To,
The Chairperson,
Department of Physics,
Indian Institute of Science,
Bangalore – 560012, India

Ref: Tender No:

Dated: XXXXX

Supply and installation of _____ to Department of Physics, IISc
Bangalore.

Sir,
I've carefully gone through the Terms & Conditions contained in the above referred tender. I hereby declare that my company/ firm is not currently debarred / blacklisted by any Government / Semi Government organizations / institutions in India or abroad. I further certify that I'm a competent officer in my company / firm to make this declaration.

Or

I declare the following

Sl.No	Country in which the company is Debarred /blacklisted / case is Pending	Blacklisted / debarred by Government / Semi Government/Organizations /Institutions	Reason	Since when and for how long
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(NOTE: In case the company / firm was blacklisted previously, please provide the details regarding period for which the company / firm was blacklisted and the reason/s for the same).

Yours faithfully
(Signature of the Bidder)

Name
Designation, Seal

Date:

Annexure – 4:

Declaration for acceptance of terms and conditions

To,
The Chairperson,
Department of Physics,
Indian Institute of Science,
Bangalore – 560012, India

Ref: Tender No: XXXXXX
Dated: XXXX

Supply and installation of _____ to Department of Physics, IISc Bangalore.

Sir,

I've carefully gone through the Terms & Conditions as mentioned in the above referred tender document. I declare that all the provisions of this tender document are acceptable to my company. I further certify that I'm an authorized signatory of my company and am, therefore, competent to make this declaration.

Yours faithfully,

(Signature of the Bidder)

Name

Designation, Seal

Date:

Annexure – 5:

Details of items quoted:

- a. Company Name
- b. Product Name
- c. Part / Catalogue number
- d. Product description / main features
- e. Detailed technical specifications
- f. Remarks

Instructions to bidders:

1. Bidder should provide technical specifications of the quoted product/s in detail.
2. Bidder should attach product brochures along with technical bid.
3. Bidders should clearly indicate compliance or non-compliance of the technical specifications provided in the tender document.

Section 6 – Commercial Bid

The commercial bid should be furnished with all requirements of the tender with supporting documents as mentioned under:

S.No	Description	Cat. Number	Quantity	Unit Price	Sub total
1.	Essential items noted in the technical specification				
1.a	... (details of essential items)				
1.b	...				
2.	Optional items noted in the technical specification				
2.a	... (details of essential items)				
2.b	...				
3.	Accessories for operation and installation				
4.	All Consumables, spares and software to be supplied locally				
5.	Warranty (3 years)				
6.	AMC 2 years beyond warranty				

Any additional items

S.No	Description	Cat. Number	Quantity	Unit Price	Sub total

Addressed to

The Chairperson,
Attn: Dr. Vibhor Singh
Department of Physics,
Indian Institute of Science
Bangalore – 560012, India

Section 7 – Checklist

(This should be enclosed with technical bid- Part A)

The following items must be checked before the Bid is submitted:

1. Sealed Envelope “A”: Technical Bid

1. Section 5- Technical Bid (each page signed by the authorized signatory and sealed) with the below annexures:
 - a. Annexure 1: Bidders details
 - b. Annexure 2: Declaration regarding experience
 - c. Annexure 3: Declaration regarding clean track record
 - d. Annexure 4: Declaration for acceptance of terms and conditions
 - e. Annexure 5: Details of items quoted
2. Copy of this tender document duly signed by the authorized signatory on every page and sealed.

2. Sealed Envelope “B”: Commercial Bid

Section 6: Commercial Bid

Your quotation must be submitted in two envelopes: Technical Bid (Envelope A) and Commercial Bid (Envelope B) super scribing on both the envelopes with Tender No. and due date and both of these in sealed covers and put in a bigger cover which should also be sealed and duly super scribed with Tender No., Tender description & Due Date.