INDIAN INSTITUTE OF TECHNOLOGY MADRAS
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P. Sarvaharana
Assistant Registrar (Project Purchase)

Ref: ELE/16-17/325/DSTX/DELE
Date: 16.02.2017

Tender No: ELE/DELE/03/2017

Due Date: 03.03.2017, 3:30pm

Dear Sir/Madam,

On behalf of the Indian Institute of Technology Madras, offers by way of limited tender are invited for the supply of "**Dynamic Signal Analyzer**" conforming to the specifications given in Annexure.

Instructions to the Bidder

(i) **Preparation of Bids:** - The tenders should be submitted under two-bid system (i.e.) Technical bid and Financial bid.

(ii) **Delivery of the tender:** - The tender shall be sent to the below-mentioned addresses either by post or by courier so as to reach our office before the due date and time specified in our Schedule. The offer/bid can also be dropped in the tender box on or before the due date and time specified in the schedule. The tender box is kept in the office of the "Assistant Registrar, Project Purchase" IC & SR Building 2nd floor, I.I.T. Madras, Chennai – 600 036.

(iii) **Opening of the tender:** - The offer/Bids will be opened by a committee duly constituted for this purpose. The technical bids will be opened first and it will be examined by a technical committee which will decide the suitability of the bid as per our specifications and requirements. The bidders will be invited for opening of Technical bids. In respect of opening of financial bid, those bidders who are technically qualified only will be called for.

(iv) **Prices:** - The price should be quoted in nett per unit (after breakup) and must include all packing and delivery charges to various Departments/Centres/Institutions. The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. However the percentage of tax & duties should be clearly indicated.

The price should be quoted without custom duty and excise duty, since I.I.T. Madras is exempt from payment of excise duty, and the custom duty will be paid at concessional rate against duty exemption certificate.

In case of import supply, the price should be quoted on EX-WORKS and CIP basis indicating the mode of shipment.

(v) **Agency Commission**: - Agency commission, if any, will be paid to the Indian agents 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 the case of 'Nil' commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent. The foreign Principal should indicate about the percentage of payment and it should be included in the originally quoted basic price, if any.

(vi) **Terms of Delivery**: - The item should be supplied to our various Departments/Institutions as per Purchase Order. In case of import supply, the item should be delivered at the cost of the supplier to our Institution. The Installation/Commissioning should be completed as specified in our important conditions.

(vii) **Technical Bid Opening:** The technical bid will be opened in Conference room, Department of Electrical Engineering, IIT Madras and the financial bids of those tenders who are technically qualified will be opened at a later date under intimation to them.

(viii) IIT Madras reserves the full right to accept / reject any tender at stage without assigning any reason.

Yours sincerely,

P. Sarvaharana
Assistant Registrar (Project Purchase)
IC&SR, I.I.T. Madras

SCHEDULE

Important Conditions of the tender

1. The due date for the submission of the tender is 03.03.2017, 3:30pm.

2. The offers / bids should be submitted in two bids systems (i.e.) Technical bid and Financial bid. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes, transportation, packing & forwarding, installation, guarantee, payment terms, pricing terms etc. The Technical bid and Financial bid should be put in separate covers and sealed. Both the sealed covers should be put in a bigger cover. The Open Tender for supply of "_____" should be written on the left side of the Outer bigger cover and sealed.

3. **EMD: -** EMD should be at 2% (two percent) of the tender value quoted by the bidder. The EMD should be included in the Financial bid which will not be opened for Technical evaluation. Enclosing the EMD in the Technical bid will automatically disqualify the tenderer. EMD should be in the form of DD in favour of "The Registrar, Indian Institute of Technology Madras" and payable at Chennai. The tender without EMD would be considered as UNRESPONSIVE and REJECTED. Photo/FAX copies of the Demand Draft/Banker's pay orders will not be accepted. No interest will be paid for the EMD and the EMD (Bid Security) will be refunded to the successful bidder on receipt of Performance Security.

4. **Performance Security:-** The successful bidder should submit Performance Security for an amount of 5% of the value of the contract/supply. The Performance Security may be furnished in the form of an Account Payee DD, FD Receipt from the commercial bank, Bank Guarantee from any nationalized bank of India will be an acceptable.

Only after submission of Performance Security, Purchase Order/Work Order will be released / L.C will be opened.

Performance Security in the form of Bank Guarantee:- Incase the successful bidder wishes to submit Performance Security in the form of Bank Guarantee, the Bank Guarantee should be routed through the Beneficiary Bank to the end user bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee from a Nationalized Bank of India.

The Bank Guarantee should remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including the warranty obligations.

5. If an Indian agent is involved, the following documents must be enclosed:
   Foreign principal's proforma invoice indicating the commission payable to the Indian Agent and nature of after-sales service to be rendered by the Indian Agent.
   - ✓ Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.
   - ✓ The enlistment of the Indian agent with Director General of Supplies & Disposals under the Compulsory Registration Scheme of Ministry of Finance.

6. The offer/bids should be sent only for a machine that is available in the market and supplied to a number of customers. A list of customers in India and abroad with details must accompany the quotations. Quotations for a prototype machine will not be accepted.

7. Original catalogue (not any photocopy) of the quoted model duly signed by the principals must accompany the quotation in the Technical bid. No prices should ever be included in the Technical bid.

8. Documentary proof for the claimed position and repetition accuracies must be obtained from the principals and submitted along with the relevant pages of the standards.

9. Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.

10. **Validity:** Validity of Quotation not less than 90 days from the due date of tender.

11. **Delivery Schedule**:- The tenderer should indicate clearly the time required for delivery of the item. In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied.

12. **Risk Purchase Clause**:- In the 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 other sources on the total risk of the supplier under risk purchase clause.

13. **Payment**:- No Advance payment will be made for Indigenous purchase. However 90% Payment against Delivery and 10% after installation are agreed to wherever the installation is involved. In case of import supplies the payment will be made only through 100% Letter of Credit i.e. (90% payment will be released against shipping documents and 10% after successful installation wherever the installation is being done).

14. **Advance Payment:-** No advance payment is generally admissible. In case of specific percentage of advance payment is required, the Foreign Vendor has to submit a Bank Guarantee equal to the amount of advance payment and it should be routed through the Beneficiary Bank to the end user Bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee through a Nationalized Bank of India.

15. **On-site Installation**: - The equipment or machinery has to be installed or commissioned by the successful bidder within 15 to 20 days from the date of receipt of the item at site of IIT Madras.

16. **Warranty/Guarantee**: - The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Any extended warranty offered for the same has to be mentioned separately. (for more details please refer our Technical Specifications).

17. **Late offer**: - The offers received after the due date and time will not be considered. The Institute shall not be responsible for the late receipt of Tender on account of Postal, Courier or any other delay.

18. **Acceptance and Rejection**: - I.I.T. Madras has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.

19. **Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.**

20. **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 Chennai in Tamil Nadu.

21. All Amendments, time extension, clarifications etc., will be uploaded on the website only and will not be published in newspapers. Bidders should regularly visit the above website to keep themselves updated. No extension in the bid due date/ time shall be considered on account of delay in receipt of any document by mail.

Acknowledgement:- It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE
COMPANY WITH DATE

Specification of
Dynamic Signal Analyzer

Measurement Groups

Groups	FFT, Octave Analysis, Swept-Sine

Frequency

Range	102.4 kHz or 100 kHz (both displays have the same range)
FFT spans	195.3 mHz to 102.4 kHz or 191 mHz to 100 kHz. The two displays can have different spans and start frequencies.
FFT resolution	100, 200, 400 or 800 lines
Real-time bandwidth	102 kHz (highest FFT span with continuous data acquisition and averaging)
Accuracy	25 ppm from 20 °C to 40 °C

Dynamic Range

Dynamic range	
FFT and Octave	90 dB typical, 80 dB guaranteed.
Swept-Sine	145 dB Includes spurs, harmonic and intermodulation distortion and alias products. Excludes alias responses at extremes of span.
Harmonic distortion	<-80 dB (single tone in band)
Intermod. distortion	<-80 dB (two tones in band, each less than -6.02 dBfs)
Spurious	<-80 dBfs
Alias responses	<-80 dBfs (single tone outside of span, <0 dBfs, less than 1 MHz)
Full-span FFT noise floor	-100 dBfs typ. (input grounded, >-30 dBV, Hanning window, 64 rms averages)
Residual DC response	<-30 dBfs (FFT with Auto-Cal on)

Amplitude Accuracy

Single channel	±0.2 dB (excluding windowing)
Cross channel	±0.05 dB (DC to 102.4 kHz) (transfer function measurement, both inputs on the same range, rms averaged)

Phase Accuracy

Single channel	±3.0 deg. relative to external TTL trigger (-50 dBfs to 0 dBfs, frequency <10.24 kHz, center of frequency bin, DC coupled).
Cross channel	±0.5 deg. (DC to 51.2 kHz) ±1.0 deg. (DC to 102.4 kHz)

Signal Inputs

Number of inputs	2
Full-scale input range	-50 dBV (3.16 mVp) to +34 dBV (50 Vp) in 2 dB steps
Maximum input level	57 Vp
Input configuration	Single-ended (A) or differential (A-B)
Input impedance	1 MΩ + 50 pF
Shield to chassis	Floating mode: 1 MΩ + 0.01 µF. Grounded mode: 50 Ω. Shields grounded in (A-B) mode
Max. shield voltage	4 Vp
AC coupling	0.16 Hz cutoff frequency
CMRR	90 dB at 1 kHz (input range <0 dBV) 80 dB at 1 kHz (input range <10 dBV) 50 dB at 1 kHz (input range ≥10 dBV)
ICP signal conditioning	Current source: 4.8 mA

	Open circuit voltage: +26 V
A-weight filter	Type 0 tolerance, ANSI standard S1.4-1983 (10 Hz to 25.6 kHz)
Crosstalk	<-145 dB below signal (input to input and source to inputs, 50 Ω receiving input source impedance)
Input noise	<10 nVrms/√Hz above 200 Hz (<-160 dBVrms/√Hz)

Trigger Input

Modes	Free run, Internal, External, or External TTL
Internal	Level adjustable to ±100 % of input scale, positive or negative slope. Min. trigger level: 5 % of input range
External	Level adjustable to ±5 V in 40 mV steps, positive or negative slope. Input impedance: 1 MΩ Max. input: ±5 V Min. trigger amplitude: 100 mV
External TTL	Requires TTL level to trigger (low <0.7 V, high >3.0 V)
Post-trigger	Measurement record is delayed up to 8192 samples after the trigger.
Pre-trigger	Measurement record starts up to 8192 samples prior to the trigger.

Transient Capture

Mode	Continuous data recording
Maximum rate	262,144 samples/s for both inputs
Maximum capture Length	2 Msamples (normal) to 8 Msamples (with optional memory)

Octave Analysis

Standards	Conforms to ANSI standard S1.11- 1986, Order 3, Type 1-D and IEC 225-1966
Frequency range	*Single channel* 1/1 Octave 0.125 Hz to 32 kHz 1/3 Octave 0.100 Hz to 40 kHz 1/12 Octave 0.091 Hz to 12.3 kHz *Two channels* 1/1 Octave 0.125 Hz to 16 kHz 1/3 Octave 0.100 Hz to 20 kHz 1/12 Octave 0.091 Hz to 6.17 kHz
Accuracy	<0.2 dB (1 second stable average, single tone at band center)
Dynamic range	80 dB (1/3 Octave, 2 second stable average) per ANSI S1.11-1986
Sound level	Impulse, Peak, Fast, Slow and L_{eq} per ANSI S1.4-1983 Type 0 and IEC 651-1979 Type 0

Source Output

Amplitude range	0.1 mVp to 5 Vp
Amplitude resolution	0.1 mVp (output >500 mVp)
DC offset	<10.0 mV (typ.)
Offset adjust	±5 VDC (sine, two-tone)
Output impedance	<5 Ω, ±100 mA peak output current

Sine Source

Amplitude accuracy	±1 % of setting, 0 Hz to 102.4 kHz 0.1 Vp to 5.0 Vp, High-Z load
Harmonics, sub-harm. & spurious	0.1 Vp to 5 Vp <-80 dBc (fundamental <30 kHz) <-75 dBc (fundamental <102 kHz)

Two-Tone Source

Amplitude accuracy	±1 % of setting, 0 Hz to 102.4 kHz 0.1 Vp to 5 Vp, High-Z load
Harmonics, sub-harm.	<-80 dBc, 0.1 Vp to 2.5 Vp

White Noise Source

Time record	Continuous or burst
Bandwidth	DC to 102.4 kHz or limited to span
Flatness	<0.25 dBpp (typ.), <1.0 dBpp (max.), 5000 rms averages

Pink Noise Source

Bandwidth	DC to 102.4 kHz
Flatness	<2.0 dBpp, 20 Hz to 20 kHz (using averaged 1/3 Octave Analysis)
Chirp Source	
Time record	Continuous or Burst
Output	Sine sweep across the FFT span
Flatness	±0.25 dB (amplitude: 1.0 Vp)
Swept-Sine Source	
Auto functions	Source level, input range and frequency resolution
Dynamic range	145 dB
Arbitrary Source	
Amplitude range	±5 V
Record length	2 Msamples (playback from arbitrary waveform memory or capture buffer). Variable output sample rate.
General	
CRT monitor	Monochrome/Color, 800H by 600V resolution
Interfaces	IEEE-488.2, RS-232 and printer interfaces standard. All instrument functions can be controlled through computer interfaces. A PC keyboard input should be provided for additional flexibility.
Hardcopy	Print to dot matrix and PCL compatible printers. Plot to HP-GL or postscript plotters. Print/plot to RS-232 or IEEE-488.2 interfaces or to disk file. Additional file formats include GIF, PCX and EPS.
Data storage	USB drive
Preamp power	Power connector needed
Power	70 W, 100/120/220/240 VAC, 50/60 Hz

Important Notes:

1. Provide break up of cost of each individual items. All items must be quoted. Please provide prices of individual units of the accessories needed for complete operation and connection with an existing semiconductor device analyzer (B1500A) to measure 1/f and Random telegraph Noise measurement. We may reject the tender if all items (listed above) are not included.
2. Please provide at least 3 references of laboratories where you have installed similar systems including specification of the systems. We may reject the tender if we find the reference systems unsatisfactory.
3. Please provide details of after sales service. We may reject the quote if the after sales service details are found unsatisfactory.
4. Please provide a clear warranty statement.
5. Please provide separate technical and financial bids in sealed envelopes.
6. Please mark tender number on top of the cover envelope.