

	INDIAN INSTITUTE OF TECHNOLOGY MADRAS Chennai 600 036 Telephone: [044] 2257 9723/9798 E-mail: tender@imail.iitm.ac.in	
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The Senior Manager (Project Purchase)

Ref: ELE/2020/022/RADH/5G DRIVETEST

Date: 18/09/2020

Open Tender No: ELE/2020/022/RADH/5G DRIVETEST

Due Date: 13/10/2020, 5 PM

Pre-Bid meeting: - NA

Technical Bid opening meeting on 14/10/2020, 3:00 PM at Department of Electrical Engineering, IIT-Madras.

Dear Sir/Madam,

On behalf of the IIT Madras offers are invited for the supply of DRIVE TEST TOOLS for multiple quantities of the following items and their corresponding accessories.

- **ITEM A:** 5G stand-alone outdoor drive test tool kit
- **ITEM B:** 5G Drive test log post processing tool kit for measurement of air interface

The vendors should quote for BOTH Item A and Item B to be eligible for consideration. (Mandatory)

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 address mentioned below, 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:

**The Senior Manager,
 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 will be examined by a technical committee which will decide the suitability of the bids as per our specifications and requirements. Qualified bidders will be called.

IV. Prices: - The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges to the **Department of Electrical Engineering**. The offer/bid should be exclusive of taxes and duties. The percentage of tax & duties should be clearly indicated separately. Kindly note that IIT Madras is eligible for concessional GST and relevant certificate will be issued.

In case of import supply, the price should be quoted without custom duty. IIT Madras is exempted from levy of IGST on Imports and eligible for concessional custom duty (not exceeding 5%) and the price should be quoted on EX WORKS and CIP basis (stating the Cost, Insurance, Freight separately) and indicating the mode of shipment.

V. Agency Commission: - Agency commission, if any, will be paid to the Indian agents in rupees after receipt of the equipment and its satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in the tender document 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 the percentage of payment and it should be included in the basic price quoted originally (if any).

VI. Terms of Delivery: - The item should be supplied to the **Department of Electrical Engineering, IIT Madras** as per the 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 on **14/10/2020, 3:00 PM** at the **Department of Electrical Engineering, IIT-Madras**. The financial bids of those tenderers 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 any stage without assigning any reason.

- i) IIT Madras also reserve the right to purchase none or only a subset of the items (as shown in Table 1) without assigning any reason.
- ii) The actual quantities ordered may differ based on the requirement at the placement of order.

Yours sincerely,

The Senior Manager (Project Purchase)
IC&SR Building, I.I.T. Madras,
Chennai – 600 036.

SCHEDULE

Important Conditions of the tender

- 1) The due date for the submission of the tender is **13/10/2020, 5 PM.**
- 2) The offers / bids should be submitted in a two bids system, i.e., Technical bid and Financial bid.
 - a. The technical bid should consist of all technical details that the vendor is bidding for.
 - i. The vendors should **quote for Item A and Item B**
 - ii. There should be a single technical bid for the items provided in Table 1 that the vendor is bidding for.
 - a. The sub-components (if any) for each item should be explicitly provided.
 - b. The items (along with their sub-components) in the bid should clearly be demarcated.
 - iii. Any quoted item has to be self-contained and operable with respect to accessories, equipment, software required.
 - iv. For each quoted item, there should be a compliance table based on the equipment specifications provided in the tender. Each of the quoted item will be examined for technical compliance independently of the other items.
 - a. For each technical specification of the compliance table, there should be an explicit reference (page no, paragraph, line no) in the data sheet.
 - b. In the corresponding data sheet, the particular line should be highlighted.
 - c. The committee reserves the right to disqualify a technical bid if such explicit information is not provided and the information is not easily accessible.
 - v. The EMD in the form of account payee DD in favor of “Registrar I.I.T. Madras” should be included in the technical bid and NOT in the financial bid. The vendor bid for a particular item will be disqualified if the EMD payment for that particular item is not present. The EMD for the items is provided below.
 - a. Any offer not accompanied with the EMD shall be rejected summarily as non-responsive. EMD should remain valid for a period of 45 days beyond the final bid validity period.
 - b. The EMD of the unsuccessful bidders shall be returned within 30 days of the end of the bid validity period. The same shall be forfeited, if the tenderers withdraw their offer after the opening during the bid validity period. The Institute shall not be liable for payment of any interest on EMD. EMD is exempted for Micro and Small Enterprises (MSE) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) and Startups as recognised by Department of Industrial Policy & Promotion (DIPP).
 - c. When a foreign vendor does not have a local agent in India, he can submit a demand draft equal to Rs.3,00,000/- or wire transfer the amount to our account as detailed in the attachment (Annexure II) and enclose the proof with the technical bid.

Table 2: EMD for an item.

Item	Total EMD (in INR)
Item A + Item B	300,000

- b. The Financial bid should indicate the item-wise price for each item with HSN code, and it should contain all Commercial Terms and Conditions including Taxes, transportation, packing & forwarding, installation, guarantee, payment terms, pricing terms etc.
- i. The price should be quoted as below and must include all packing and delivery charges to the departments. 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.**
 - a. The price should be quoted without custom duty and GST, since IIT Madras, is eligible for concessional GST and customs duty.
 - b. In case of import supply, the price should be quoted on CIF basis indicating the mode of shipment and should be applicable to shipping to IIT Madras.
 - c. The price may be quoted in INR, USD, and/or Euro. The prevailing market exchange rate on the day of bid evaluation will be used to compare bids.
 - ii. The financial bid for an item along with its cover sheet should be put in in a separate envelope and sealed. The envelope should explicitly mention (written on the left side) the item for which the price bid is for. The envelope (Financial bid + cover letter) for the item will be opened only if the item meets the Technical Specification.
 - iii. All the sealed envelopes should be put in a bigger cover which should mention “**Consolidated Financial Bid for Drive Test Tools**”. This cover has to be sealed properly.
- 3) **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 in India. **The performance security should be furnished within 14 days from the delivery of the purchase order.**
- Performance Security in the form of Bank Guarantee:** - In case the successful bidder wishes to submit Performance Security in the form of Bank Guarantee, the Bank Guarantee should be routed 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.
- 4) **Indian agent:** 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.
- 5) Catalogue of the quoted model duly signed by the principals must accompany the quotation in the Technical bid.
- 6) Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.
- 7) **Validity:** The validity of Quotation should not be less than 90 days from the due date of tender.

- 8) **Delivery Schedule:** - The tenderer should indicate clearly the time required for delivery of the item (subjected to the executive committee-IITMadras approval). 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. If there is delay, the penalty will be @1% per week of delay subject to a max of 10% of the value of purchase order and if the delay is more than accepted time frame by IITM, the PO would be cancelled, and liquidated damages will be enforced.
- 9) **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.
- 10) **Payment:** -
- (i) 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).
 - (ii) **Advance Payment:** No advance payment is generally admissible. In case of specific percentage of advance payment is required, the Vendor has to submit a Bank Guarantee from a Nationalized Bank of India equal to the amount of advance payment.
- 11) **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
- 12) **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).
- 13) **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.
- 14) **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.
- 15) **Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.**

16) **Disputes and Jurisdiction:**

Settlement of Disputes: Any dispute, controversy or claim arising out of or in connection with this PO including any question regarding its existence, validity, breach or termination, shall in the first instance be attempted to be resolved amicably by both the Parties. If attempts for such amicable resolution fails or no decision is reached within 30 days whichever is earlier, then such disputes shall be settled by arbitration in accordance with the Arbitration and Conciliation Act, 1996. Unless the Parties agree on a sole arbitrator, within 30 days from the receipt of a written request by one Party from the other Party to so agree, the arbitral panel shall comprise of three arbitrators. In that event, the supplier will nominate one arbitrator and the Project Coordinator of IITM shall nominate an arbitrator. The Dean IC&SR will nominate the Presiding Arbitrator of the arbitral tribunal. The arbitration proceeding shall be carried out in English language. The cost of arbitration and fees of the arbitrator(s) shall be shared equally by the Parties. The seat of arbitration shall be at IC&SR IIT Madras, Chennai.

- a. **The Applicable Law:** This Purchase Order shall be construed, Interpreted and governed by the Laws of India, Court at Chennai shall have exclusive jurisdiction subject to the arbitration clause.

- b. 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.

17) 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**

TECHNICAL SPECIFICATIONS

Terms & Conditions Applicable to all Items

- 1) Any accessories, equipment, software required for an item should be self-contained.
- 2) Only OEMs or an authorized distributor with valid authorization letter from the OEM will be permitted to submit the offer.
- 3) Vendor should have operated in India (have an office and a service center) for the last 5 years and should have supplied equipment to reputed institutes and labs in India. Evidence for the same should be provided.
- 4) Vendor should share details of similar equipment supplied to reputed institutes, labs in India with the contact details of the users. User satisfaction reports may be sought directly by the committee and a vendor might be disqualified based on the report.
- 5) Vendor should have repair facilities in India ensuring timely services for repairs in future.
- 6) All equipment should work with Indian power supplies, 240V and 50 Hz. Appropriate power connectors should be provided.
- 7) The quoted product should be supported till 30th Sep. 2025. The product should be serviceable, repairable, spare parts be available and technical support can be provided by the vendor. A letter authenticated by the OEM company for the same should be provided for each item (and sub-equipment) quoted by the vendor.
- 8) Free firmware/software upgrades from the date of delivery on the product features purchased for three years.
- 9) Vendor should quote 3-year warranty or as specified in the equipment list, whichever is higher.

Evaluation Criteria:

- The final L1 for will be based on the total cost of all the items.
- The Institute will place its order(s) for the item at the L1 price for the item as determined above.
- The institute reserves the right to negotiate for each item with the L1 vendor determined as appropriate.

Please provide a compliance table for the above conditions.

If a vendor desires partial shipment, it will be permitted.

1. 5G stand-alone outdoor drive test tool kit for measurement of air interface parameters in wireless networks must support FR1 & FR2 Band
 - a. 5G stand-alone outdoor drive test tool kit - 1 Unit
 - i. 5G mobile handset for the band n78 (3.5 GHz) 1- Unit
 - ii. 5G mobile handset for the band n258 (26.4 GHz) 1-Unit
 - iii. (Or instead of (i) and (ii)) 5G mobile handset supporting both the frequency band of n78 & n258 - 1 Unit
 - b. 5G Drive test log post processing tool kit for measurement of air interface parameters in wireless networks must support FR1 & FR2 Band
 - i. 5G Drive test log post processing tool kit - 1 Unit

ITEM A: Drive Test Tool Specifications

Specification	Parameters
5G band Support	N78
Sub Carrier Spacing (KHz)	15,30,60 (for N78)
Channel Bandwidth	Up to 100 MHz
Max number of beams per channel	8
5G band Support	N257 & N258
Sub Carrier Spacing (KHz)	60,120,240 (for N258)
Channel Bandwidth	Up to 400 MHz
Max number of beams per channel	64
Modulation Scheme	QPSK, 16 QAM, 64 QAM, 256 QAM
Radio frame	10 ms
Duplex mode	TDD
Access scheme	Downlink: CP-OFDMA Uplink: CP-OFDMA & DFT-S-OFDM
MIMO Scheme	Max of two code word mapped to Max number of layers up to 8 in Downlink Max of two code word mapped to Max number of layers up to 4 in Uplink
Supporting massive MIMO and Beam forming measurement	Yes
Standards	As per latest 3GPP release R15 (Supporting Bandwidth part (BWP), Short message service, QoS flow, 5QI, NR Dual carrier, Carrier aggregation, etc.)
Field measurement Specification	
Cell measurement and Current cell information	Cell Type (Pcell, Scell),
	Channel bandwidth,
	NR ARFCN,
	Physical channel ID (PCI),

	Beam index / Type,
	Timing offset,
	SSB NR ARFCN,
	PSS,
	SSS,
	Sub carrier spacing SCS,
Bandwidth part -BWP measurement	BWP ID (Initial & Dedicated),
	BWP numerology,
	BWP bandwidth,
	BWP ARFCN,
	BWP PRB
Physical layer measurements	SS-RSRP,
	SS-RSRQ,
	RS-SINR,
	CSI-RSRP,
	CSI- SINR
UL power control measurement	Initial PUSCH Tx power,
	PUCCH Tx power,
Synchronization signal block – SSB measurement	SSB index,
	Frequency,
	SCS,
	5G NR mode,
	Number SSB beam,
	RSSI measurement,
	PSS (RSRP, SINR, Pathloss),
	PBCH measurement (RSRP, SINR, Pathloss),
	Serving Cell SSB Beam SINR,
	Serving Cell <1-4> Detected SSB Beam (Index, RSRQ, RSRP, SINR) Serving Cell <1-4> Detected SSB Beam (Index, RSRQ, RSRP, SINR) Serving Cell <1-4> Detected SSB Beam (Index, RSRQ, RSRP, SINR)
Random access procedure, RACH parameters and RACH measurement	Serving cell,
	PRACH configuration,
	Type,
	Preamble format,
	initial Tx power,
	Response Window Size,
	RA- RNTI,
	Preamble count,
	Preamble back off,
	Preamble Success,
	Contention resolution failure,
	RACH failure
Physical Channel information	PDSCH Throughput,
	PUSCH Throughput,

	PDSCH/ PUSCH resource block allocation, PDSCH/ PUSCH resource allocation type
Link adaptation and Measurement	Scheduling parameters for UL/DL- Rank, PRB's. Scheduled modulation per codeword (DL), DCI count UL/DL, PUSCH Rank, PDSCH rank, PUSCH PRB, PDSCH PRB, PUSCH modulation, PDSCH modulation, PUSCH MCS, PDSCH MCS, PUSCH TBS, PDSCH TBS, PRB utilization and PRB index
MAC	UL/DL Throughput measurement
RLC	UL/DL Throughput measurement
PDCP	UL/DL Throughput measurement
Additional measurement and Reports for analysis	Layer 2, Layer 3 measurement message (MIB, SIB1 to SIB9), Application layer, Report generation of drive test analysis and KPI. Data analysis, reporting, bench marking & advanced troubleshooting Real-time voice quality testing, Signaling measurement, Measurement report and events, SMS, RTT, Latency, 5QI, QoS

ITEM B: Post Processing tool Kit Specifications:

Parameters	Specification
5G Band	Must support Sub band 6GHz (n78) & mm Wave band (n258). Can be separate devices or the same device.
Standards	As per 3GPP release R15
Post processing of Drive test log Measurement analysis	1. Physical layer measurement: Physical channel and Reference signal 2. Layer 2 measurement – MAC, RLC, PDCP 3. Layer 3 measurement- RRC signaling and NAS signaling. Layer 3 decoding with Event identification 3. Layer 3 measurement- RRC signaling and NAS signaling. Layer 3 decoding with Event identification 3. Layer 3 measurement- RRC signaling and NAS signaling. Layer 3 decoding with Event identification 4. Application layer
Map plot for analysis	SS- RSRP, SS-RSRQ, SS-SINR, CSI-RSRP, CSI- RSRQ, CSI- SINR, Signal Coverage and Quality analysis. Data throughput- UL/DL
NR Ue capability measurement	Initial Cell Acquisition Band, NR DL ARFCN, NR Serving cell PCI, SSB Index, L1 measurements RSRP, RSRQ, SINR
Physical channel measurement	PBCH, PRACH, PDCCH, PDSCH, PUSCH
Initial access and Resource allocation measurement and analysis	1.SSB 2.BWP 3.Frequency and Time RB allocation

	4. PRB
	5.CQI
	6.MCS
	7.Modulation type
	8.RNTI information
	9.RRC information elements
	10.TBS
	12. PDCCH DCI Format Info
	13. PDSCH/ PUSCH mapping type
	17. Beam forming measurement,
	18.Carrier aggregation
	19.NR Dual carrier,
	20.TDD UL/DL configuration parameters
	22. RRC state: Idle, inactive, Connected
	25. RRC signaling msg configuration- SRB/ DRB
Uplink / Down link data measurement	Throughput, block error rates, re-transmission of transport blocks PDCP Layer throughput, RLC layer throughput, MAC layer throughput, PDSCH BLER, PUSCH BLER
System Information	MIB, SIB1 to SIB9



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



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

A. Details of Account Holder

Name of the Institution	Indian Institute of Technology - Madras
Complete Contact Address	Industrial Consultancy and Sponsored Research Indian Institute of Technology-Madras, IIT- Madras Campus Post Office, Sardar Patel Road, Guindy, CHENNAI - 600 036
Telephone No./ Fax No.	Tel - 044-22578355 / Fax - 044-22570545
E- mail ID of the FO/AO/REG/DIR	dricsr@iitm.ac.in

B. Bank Account Details:

Institution Account Name (As per Bank Record)	The Registrar, Indian Institute of Technology - Madras
Account No.	2722101001741
Account Print Name	IIT F A/C , The Registrar IIT Madras
IFSC CODE	CNRB0002722
Bank Name (in full)	Canara Bank
Branch Name	IIT-Madras Branch
Complete Branch Address	Canara Bank, IIT-Madras Branch, IIT- Madras Campus Post Office, Sardar Patel Road, Guindy, CHENNAI - 600 036
MICR No.	600015085
Account Type	Savings Account

Certified that the Institute's account is in an RTGS enabled branch.
I hereby declare that the particulars given above are correct and complete.

Date: _____ Signature of the Competent Authority
of the Institution with seal.

K. M. Gopinath
DEPUTY REGISTRAR (IC&SR) (IC)
IC & SR, I.I.T. MADRAS
CHENNAI - 600 036

Certified that the particulars furnished above are correct as per our records.

Date: _____ Signature of the Authorized
Bank Official with Bank Seal.



for CANARA BANK
B. Sekar
SENIOR MANAGER
IIT-MADRAS CHENNAI 600 036.

B. SEKAR
Senior Manager
SP No. 39312



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



K VIJAYALAKSHMI
DEPUTY REGISTRAR (IC&SR) *KL*

Project Accounts
July 5, 2019

TO WHOMSOEVER IT MAY CONCERN

In connection with project, US currency may be transferred to CANARA BANK, IIT – MADRAS
Branch In connection with the following details.

FOR TRANSFER OF CURRENCY US DOLLAR

Please Credit in USD

(THROUGH)

JP MORGAN CHASE, NEW YORK
SWIFT CODE: CHASUS33

For credit to

USD ACCOUNT No: 001 – 1395969, of CANARA BANK INTERNATIONAL DIVISION MUMBAI

For Further Credit to

ACCOUNT NO: 2722101001741 of IIT Chennai – Swift Code: CNRBINBBIT OF THE
REGISTRAR, IIT, MADRAS

K Vijay
DEPUTY REGISTRAR(IC & SR) i/c

This is to certify that particulars furnished are correct.

[Signature]
Senior Manager
Canara Bank – IIT Madras branch

B. SEKAR
Senior Manager
SP No. 39312



DEPUTY REGISTRAR (IC&SR) (i/c)
IC & SR, I.I.T. MADRAS
CHENNAI - 600 036