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TENDER – Pl.A1/Phy/50795/2019/UOK Dated : 19.06.2019

E-Tender Notice (Retender)

Department of Physics, University of Kerala, Kariavattom, invites open tender in **two-bid format** for the purchase of Vector Network Analyzer and accessories with following specifications.

Last date and time for submission of tender online	: 28.06.2019 5.00 PM
Date and time of opening of tender	: 02.07.2019 11.30 AM
For technical details contact	**Dr. Subodh G, Assistant Professor and Head, Department of Physics, University of Kerala, Thiruvananthapuram, Ph. No. 9633983404** E-Mail: gsubodh@gmail.com

For further details logon to www.etenders.kerala.gov.in

TECHNICAL SPECIFICATIONS

Vector Network Analyzer with following specifications.,

General Technical Specification

The equipment can be used for measuring properties of materials upto 40GHz using S, Y and Z parameters, Wave quantities, Impedance Ratios.Material Test Fixtures / Probes can be based on any method like — Transmission, Reflection, Resonance, Resonance Perturbation etc. — and must be included along with the offer with supporting literatures. Appropriate material test fixtures/jigs along with software for materials properties measurements must be included in the offer as essential accessories. The unit must be stand-alone model (must not needany PC/Laptop or other equipment) for testing. It must be able to test materials of any form like solid disc, sheet, ring and plate that can have dielectric constant or relative permittivity in 1–10,000 and loss tangent (tan) as low as 10^{-5}.Test specimens are of about minimum size 3mm x 0.5mm to any maximum limited by the method. The measurement software should have a capability for measuring intrinsic electromagnetic properties of dielectric and magnetic materials in a variety of formats: ε_r', ε_r'', μ_r', μ_r''. Results are displayed as a function of frequency. This software should support algorithms like NRW, NIST, Polynomial fit for material properties measurements.

During the technical evaluation, vendors should be able to do a demo of their measurement set up if required. (This demo should be conducted with in a week after opening the technical bid). Further vendors should also provide adequate support for their claim for measurement software with capability of measuring intrinsic electromagnetic properties of dielectric and magnetic materials in a variety of formats: ε_r', ε_r'', μ_r', μ_r'' with frequency.

Technical specifications

Parameter	Specifications
1. Frequency range	10 MHz to 40 GHz
1. Frequency resolution (min.)	1Hz or better
2. Frequency drift (Room Temperature to +50°C) (max.)	±0.1ppm or better
3. Aging (max.)	±0.1ppm/yr or lower
4. IF Bandwidth	1 Hz to 1 MHz or higher
5. Frequency stability	± 1 ppm or less
6. Port impedance	50 Ω nominal
7. No. of ports	2
8. Test-port damage level (RF and DC Voltage)	+27 dBm RF, 30V DC
9. Dynamic range	75 dB or better

10. Source Type	Synthesized Sweep source, integrated with the Analyser
11. Source output: (Adjustable Output power)	–20dBm to +5dBm
12. Power resolution (min.)	0.01dB
13. Harmonic performance	-20dBc or better
14. Noise floor	-75dBm or better
15. Trace Features	Noise reduction, Averaging, Smoothing
16. Trace noise	0.05dB or better
17. No. of points	10, 000 or more
18. Markers	Minimum 4 nos. per trace; Delta (∆) markers; Minimum/ Maximum; Search Left/ Search Right; Automatic n-dB bandwidth (with centre frequency) Peak-Peak, Marker tracking etc.
19. Screen	Built-in, Colour, ≥ 10” size Integrated with instrument
20. Display	dB mag, Lin mag, Phase, Smith Chart, Inverted Smith, Polar
21. Directivity	>30dB
22. Phase noise at 10KHz offset	-75dbc/Hz or better
23. Measurement accuracy: Transmission measurements Reflection measurements	 <0.1dB, <1° <1dB, <10°
24. Source match	>30dB
25. Load match	>30dB
26. Reflection tracking	≤0.08 dB
27. Transmission tracking	≤0.1dB
28. Operating voltage	220-240V, 50Hz
29. Connectivity Ports	USB, LAN, VGA out
30. Electromagnetic compatibility	As per International Standard (in line with EMC Directive 2004/108/EC)
31. Calibration Kits	Electronic kits
Essential Accessories For the microwave measurements test specimens are of about minimum size 3 mm x 0.5 mm to any maximum limited by the method. The measurement software should have a capability for measuring	1. Appropriate material test fixtures/jigs along with software for materials properties measurements must be included in the offer. 2. Waveguide 12.4 to 18 GHz with calibration kit and suitable for measuring EMI shielding

intrinsic electromagnetic properties of dielectric and magnetic materials in a variety of formats: ε_r', ε_r'', μ_r', μ_r''. Results are displayed as a function of frequency. This software should support algorithms like NRW, NIST, Polynomial fit for material property measurements.	3. Waveguide 18 to 26.5 GHz with calibration kit and suitable for measuring EMI shielding 4. 10 GHz Spilt Post Dielectric Resonator with measurement software. 5. 5 GHz Spilt Post Dielectric Resonatorwith measurement software. 6. 15 GHz Spilt Post Dielectric Resonatorwith measurement software. 7. Single, flexible: 2.4 mm (f) to 2.4 mm (m), 63 cm, 25 inches – 2 pairs 8. Test Port Adapter, 2.4 mm (f) to 2.92 mm (f), DC to 40 GHz – 2 pairs 9. Test Port Adapter, 2.4 mm (f) to 2.92 mm (m), DC to 40 GHz – 2 pairs 10. Transmission line and free space methodincluded adapters cables and calibration kit. Having a measurement software with capability for measuring intrinsic electromagnetic properties of dielectric and magnetic materials in a variety of formats: ε_r', ε_r'', μ_r', μ_r'' and return loss.
Optional Accessories Vendors should quote Cables and connectors with all possible options (frequency range), so that suitable one can be selected. The price of optional accessories will not be included in base price of equipment for preparing the comparative statement.	1. Additional low –loss cables up to 40 GHz – 4 nos 2. Connectors – 10 nos. 3. Ohmic connector (m-f, f-m) – 4 nos. 4. Semi-rigid cables with brazed connectors, 3.5 mm (m), 4.5 mm, 2 mm, 10 cm length – 5 nos. 5. A suitable UPS (for Network Analyser and one Computer) with isolation transformer having 1 hr back up time, two year warranty for ups and one year for battery. 6. A desktop computer with following

	specification. (i) Processor: Intel core i5-7400 7th generation processor or higher, ii)Processor speed: greater than 2 GHz, Operating system: Windows 10 professional, Memory: 8 GB DDR4 RAM Hard disk: 1TBSATA HDD, Integrated Intel® HD Graphics 21.5-inch Full HD LED blacklit monitor.With USB 3.1/3.0 &2.0 Ports, RJ 45, DVD R/W Wired keyboard and optical mouse Wi-Fi connectivity and BT, Inbuilt NIC card with speed up to 1000Mbps Warranty not less than 3 years, Antivirus protection not less than two years.

Warranty: The test equipment must have warranty for 5 years. If standard warranty is less, vendor must separately indicate additional charges for 5 years warranty. Vendor should be able to provide non-comprehensive AMC after the warranty period. The charges may be indicated separately.

Other General Conditions:

1. Every tenderer should submit Tender fee of **Rs. 2,500/-**
2. Every tenderer should submit Earnest Money Deposit (EMD) of **Rs. 50,000/-**

3. The tender shall be submitted in the two bids viz. Technical Bid and Financial Bid. Only those qualified in technical bid will be eligible for participating in financial bid. A presentation regarding the technical specification and item to be supplied shall be done before the technical evaluation committee if requested.

4. The bidder should be a manufacturer or their dealer specifically authorized by the manufacturer to quote on their behalf for this tender as per Manufacturer Authorization From and Indian agents of foreign principals, if any, who must have designed, manufactured, tested and supplied the equipment(s) similar to the type specified in the "Technical Specification". Such equipment must be of the most recent series/models incorporating the latest improvements in design. The models should be in successful operation for at least one year as on date of Bid Opening.

5. **Compliance Statement**: Along with the technical details provide a tabular column

indicating whether the equipment quoted by you meets the specifications by indicating 'YES' or 'NO'. If 'YES', support the claim by providing original brochures. **Vendors should provide clear brochures/data sheets about the equipment and its working. Also include adequate proof for the claim regarding the performance.**

6. **Reference:** Names of Institutes with contact person and telephone/ email where similar equipment supplied by you in India [Preferably South India] shall be mentioned in the bid.

7. Incomplete & conditional tenders and tenders received after the due date will be summarily rejected without assigning any reasons thereof.

8. The price should be inclusive of all taxes, duties, transportation, insurance, installation etc. Nothing extra will be paid in addition to the quoted rate. Any amount in Indian rupees for installation, commission, labour, spares, service etc shall be entered in item 2 of BoQ.

9. Payment Terms: 90% payment shall be made through irrevocable LC on presentation of complete and clear shipping documents and balance 10% of the amount shall be released after the receipt, installation commissioning and acceptance of the equipment.

10. Validity of tender: Tender submitted shall remain valid at least for 120 days from the date of opening the tender. Validity beyond 120 days, from the date of opening of the tender shall be by mutual consent.

11. Delivery and installation: Proposed delivery schedule should be mentioned clearly. Delivery and installation and training (one week) should be made at the Department of Physics, University of Kerala, Kariavattom campus, Trivandrum without extra cost (inclusive of documentation, demurrage, customs duty, insurance, clearance and transportation charges). University of Kerala will provide customs duty exemption certificates if required.

12. Service facility: Supplier should mention their details of service setup and manpower in Thiruvananthapuram who are responsible for after sales support.

13. The model number, make, and a printed literature of the product shall submit positively.

14. In case of any dispute, the decision of the University authority shall be final and binding on the bidders.

15. The undersigned reserves the right to reject any or all of the tenders received without assigning any reason thereof.

16. The quoted item should be under **comprehensive warranty for 5 years** or more.

17. If any component is found to be defective during the warranty period, the vendor has to replace the defective item immediately at their own cost.

18. For any queries please contact, Dr. Subodh G. Assistant Professor and Head, Department of Physics, University of Kerala, Thiruvananthapuram, Ph. No. 9633983404 E-Mail: gsubodh@gmail.com

Documents to be Uploaded

1 Signed Compliance Matrix
2. Detailed Technical Brochure
3. Under taking of support for next 10 Years
4. BoQ

The Registrar,
University of Kerala,
Senate House campus, Palayam
Trivandrum- 695 034, Kerala.