



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION**

PR No. 1000050888

RFx No. 6100002533

Vector Network Analyzer (VNA) - 1 Unit

Technical specifications

Sr. No.	Component/ Specification Name:	Specifications:	Technical Compliance (YES / NO)	Additional Information (if any)
1	Frequency range	10 MHz to 50 GHz or better		
2	Test Ports	<ul style="list-style-type: none"> a. 4 (with standard DC block). b. Appropriate ruggedized port saver / port protector must be provided for each port. c. If test ports are 2.4 mm, 2.4 mm-to-2.92 mm and 2.4 mm-to-SMA port adapters must be provided. d. Torque wrenches for 2.4 mm/ 2.92 mm / SMA standards must be provided. 		
3	Internal Sources	2 or higher, with independent control		
3.1	Power Sensor	RF Power Sensor for power calibration to perform inter-modulation (IMD) measurements to be provided.		
3.2	Direct Access	<ul style="list-style-type: none"> a. Direct access to internal receiver and source should be available (by bypassing the internal bridge). b. This should include access to LO/RF output port for external mixer setups. 		
4	IF Bandwidth	1 Hz to 10 MHz (or higher)		
5	System Dynamic Range	Better than 108 dB, all ports, over 50 MHz to 50 GHz		
6	Test Port Noise Floor	Normalized to 1 Hz IF BW: ≤ -100 dBm (500 MHz to 50 GHz)		
7	Output Power Range	<ul style="list-style-type: none"> a. <25 GHz, maximum output power > 12 dBm b. 25-40 GHz, max. output power > 5 dBm, c. 40-47 GHz, max. output power > 3 dBm. d. 47-50 GHz, max. output power > -3 dBm. 		

		e. Appropriate high-power modes must be included to meet the above power requirements.		
8	Source Phase Noise using internal reference (dBc/Hz)	a. ≤ -108 dBc/Hz at 10 KHz offset for (1 GHz to 10 GHz) b. ≤ -105 dBc/Hz at 10 KHz offset for (frequencies > 10 GHz)		
9	Trace Noise (10MHz to 50 GHz)	a. ≤ 0.05 dB rms (1 KHz IFBW) b. ≤ 1 -degree RMS (1 KHz IFBW)		
10	Spectral Performance: at Maximum Specified	Harmonics ≤ -45 dBc		
11	Receiver Noise Figure	≤ 25 dB (internal low-noise amplifier, if available, should be provided)		
12	Additional requirements	a. The instrument should have necessary enablement included to perform noise figure measurements as well as FFT-based spectral analysis. b. The instrument should have necessary enablement to perform time domain analysis (TDR) including eye-diagrams. c. Independent control of the two source frequencies and options to perform IMD measurements must be enabled.		
13	Calibration Kits	Mechanical calibration kits (for specified number of ports, up to maximum frequency) should be provided.		
14	External Instrumentation	A separate source signal analyzer unit must be provided to be used in conjunction with the VNA with the following specifications: a. Up to 43 GHz or higher maximum frequency, with analysis bandwidth up to 40 MHz. b. Ability to perform phase-noise and signal jitter analysis. c. Ability to perform sensitive noise figure measurements with internal pre-amplifier. High ENR (Excess Noise Ratio) noise source should be included. d. Ability to perform vector signal analysis. e. Phase noise ≤ -107 dBc/Hz at 10 KHz offset @ 1 GHz		
15	External Reference Input	10 MHz or better		
16	Accessories	a. Instrument dust cover should also be provided. b. Rubber caps for all the connectors. c. Torque wrenches for 2.4mm/2.92mm-SMA connectors.		
17	Firmware updates	Should be provided free-of-cost during the equipment lifetime		
18	Power	Mains input 230 V AC, 50 Hz (nominal).		

		Provide Indian standard mains cord		
19	EMC	Should be complied with all the necessary EMC (Electromagnetic Compatibility) standards		
20	Data Storage	SSD 64 GB		
21	Interfaces	LAN, GPIB: 24-pin female, USB, External monitor: DVI-D, Display Port or		
22	Instrument type	Bench top Instrument with internal PC and Windows 10 or better		
23	Display	10 inches or more Color display		
24	Warranty	1 Year standard warranty.		
25	Manuals	Programming manual, Operating Manual & Service Manuals [Softcopy and/ or hardcopy]		
26	Calibration certificate	Calibration Certificate with Test Data should be provided.		

Key Generic Requirements:

1. Complete technical specifications, make and model of each equipment, necessary parts and accessories of the equipment as mentioned in the tender document to be provided.
2. Soft copy of the technical brochures and website reference of the same must be included in the bid.
3. A local service/ maintenance center with the availability of the spares in India. Manufacturer should have Accredited Service and Calibration Centre in India to provide service during warranty period and after-sales. The manufacturer should provide the certificate for the genuineness of the warranty and service centers in India.
4. At least one free-of-cost off-site standard factory calibration should be done post installation/ demonstration within initial 3 years duration.
5. A declaration from the manufacturer stating that the service support/ spares, consumables, tools / accessories will be made available for the equipment for at least 5 years from the date of installation.
6. The vendor should have a minimum 03 (three) years of experience in supplying and successful installation of the equipment of similar specifications and should provide references (installation sites) from premier Institutes in India or abroad (preferably Government Organizations in India).
7. The vendor should provide at least 3 nos. of soft copies of PO (not older than 3 years) of similar or higher specification supplied within India (at least ONE should be from a premier Government Institution or Government organization or PSU).
8. A duly signed detailed User List (at least 3 nos.) with the concerned person's valid contact details in India where the instrument is still in the operational condition must be provided. (Format enclosed).
9. A duly signed separate compliance sheet of the specification mentioned in the "Technical Specifications" along with the deviation (if any) to be submitted.
10. Each bidder has to mandatorily quote for all the items as mentioned in the tender document. Partial Submission of bid is not permitted. Bidders should apply for all items and accessories.
11. Only New Equipment is to be Quoted (No Quote for Refurbished equipment). All the equipment should be supplied with the necessary accessories, starter-kit to start using the equipment.
12. During technical evaluation of the bids, if required then the vendor will have to give offline demonstration of the quoted model with all the options and accessories required to meet the tender specifications, with the prior intimation. Demonstration of instruments doesn't guarantee the award of contract.
13. Vendor should state categorically whether they have fully trained technical staff with certification from OEM for installation/ training of the equipment. Free-of-cost, on-site satisfactory installation/ commissioning and handover of the equipment should be completed within 7-days from the date of receipt of the material at the Institute premises or within the time as may be extended by IIT Bombay.

14. After-sales service support for repair/ replacement of non-functional parts should be available in India (including all services under warranty).
15. Warranty will commence from the date of the satisfactory installation of the equipment and the tenderer should give the warranty declaration.
16. The equipment and accessories have to be supplied and installed at IIT Bombay by the same vendor to ensure guaranteed operation, technical support/service during warranty period and after-sales calibration/ repairs/ maintenance.