CSIR-CSIO/µ-NoC/ 2025-26/ MMP015201: WP 3.1 /07 **2/09/2025**

Subject: Budgetary Quotation for VNA and Associated Accessories

Requesting a budgetary quotation for a Vector Network Analyzer (VNA) as per the specifications attached. The vendor is kindly requested to provide the following:

1. Complete solution – Quotation covering the full VNA system with all accessories as per the attached specification.

2. Separate quotations for the following items:

a) Extender Module (for the frequency range as specified).

b) Material Characterisation Setup (as per Specification 26).

c) Other accessories (as per Specification 39).

Kindly ensure that the quotation clearly mentions:

Item-wise breakup of costs.

Warranty, support, and calibration details.

Delivery timelines.

Compliance to specifications.

We request you to kindly share the quotation at the earliest for internal processing to the undersigned.

Nalini Pareek

np.csio@csir.res.in

Specifications of the required mm and Sub-THz Vector Network Analyzer after EOI

S.No.	Parameter	Requirement
1.	Frequency Range	Base unit with lower frequency band ≤ 10 MHz and higher frequency band ≥ 50 GHz. To Support Frequency Extenders 140 GHz to 220 GHz (Extended bands may be discontinuous) Along with suitable launchers (Upgradable till at least 1100GHz or more in the future) The base unit of VNA, along with extenders, continuous or discontinuous, must comply with specifications from (25-43) accordingly.
2.	Frequency Resolution	1 Hz or better
3.	Frequency Stability	Within ±0.5 ppm/year or better
4.	No of Test Ports	2 Ports extendable to 4 ports later through the controller unit or any other suitable process
5.	Internal sources	1 Source or more
6.	Number of Sweep Points	100000 or more
7.	IF Bandwidth	1 Hz to 1 MHz or better
8.	System dynamic range (at test port) at 10 Hz IF bandwidth	500MHz to 40GHz: > 117 dB or better 40 GHz to 50GHz: > 106 dB or better
9.	Maximum output Power	10MHz to 40 GHz: ≥ +6 dBm
		40 GHz to 50 GHz: ≥ -5 dBm
10.	Minimum output Power	≤ -30 dBm
11.	Power resolution	0.01 dB
12.	Corrected System Performance (with quoted Cal kit, Full frequency range of the base unit)	
	Directivity	≥ 32 dB
	Source & Load Match	≥ 27 dB
	Reflection & Transmission Tracking	≤ ±0.2 dB
13.	Phase Noise @ 10 kHz Offset	< -125 dBc/Hz @ 1 GHz
		< -107 dBc/Hz @ 10 GHz
		< -100 dBc/Hz @ 20 GHz
14.	Measurement capabilities	S parameters i.e. S11, S12, S22, S21 (Mag. and phase)
15.	Display capabilities	Log Mag, Lin Mag, Phase, Delay, Smith, Polar, SWR, Real, Imaginary, Unwrapped Phase, Positive Phase, Inverted Smith.
16.	Input damage power level for test ports (at all the ports)	> +27 dBm RF, 30 VDC or higher (the vendor may provide a suitable external DC block to comply)
17.	Display	At least 10 to 12-inch or higher diagonal color active-matrix LCD 1280 (horizontal) X 800 (vertical) resolution
18.	Number of Channels	More than 16 channels must be provided for multiple displays on the screen
19.	Sweep Type	CW, Linear, Log, Power, Segment
20.	Time Domain Analysis	Time domain analysis should be available to view reflection and transmission responses in time or distance. Time Gating feature should be available.

21.	Connectivity	LAN, USB , GPIB interface
22.	Data Storage	Internal drive with minimum 80 GB storage capacity
23.	VNA cables	2.4 mm (compatible to test port) to 2.4 mm (male); 1 nos. 2.4 mm (compatible to test port) to 2.4 mm (female); 1 nos. • Cables must be Phase Stable • Cable Length at least 1 metre
24.	Calibration kits	1. 2.4 mm Electronic Calibration kit or the Auto Cal Kit (As per the base-unit frequency range) 2. 2.4 mm Mechanical Calibration kit (As per the base unit frequency range), with both female and male standards (open, short, load, thru) with a Torque wrench or any other applicable accessories
25.	Supporting Connectors (each 2 Nos)	2.4 mm (female) to 2.4 mm (female) 2.4 mm (male) to 2.4 mm (male) 2.4 mm (female) to 2.92 mm (female) 2.4 mm (female) to 2.92 mm (male) 2.4 mm (male) to 2.92 mm (female) 2.4 mm (male) to 2.92 mm (male) 2.4 mm (female) to N-type (male) 2.4 mm (male) to N-type (male) 2.92 mm (female) to 2.92 mm (female) 2.92 mm (male) to 2.92 mm (male) N-type (female) to N-type (female) 2.4 mm (female) to SMA 3.5 (female) 2.4 mm (female) to 3.5 (male) 2.4 mm (male) to 3.5 (female) 2.4 mm (male) to 3.5 (male)
26.	Material Characterisation Set-Up	Complete waveguide-based material characterization setup operating in the X-band frequency range, suitable for accurate dielectric and magnetic property extraction of material samples. Suitable sample holders, cables, and a required calibration kit to be provided, if any extra is required other then for the base unit
Specifications for Vector Network Analyzer Extenders Module (140 GHz to 220GHz) Extenders module should be compatible with the quoted VNA base unit for Full 2-port S-parameter measurement. All the required interfaces between the VNA and the extender should be provided with the required interconnect kit and cables.		
27.	Waveguide Frequency Range	WR-5.1: 140 GHz to 220 GHz
28.	Output Power at the Waveguide Port	≥ 6 dBm
29.	Maximum Damage Level	≥ 20dBm
30.	Dynamic Range	≥ 100 dB (Entire Frequency Range 140-220GHz)
31.	RF/LO Input Connector	2.92 mm(f) or Equivalent
32.	Output Connector	Pair of WR-5.1 Waveguide Flange
33.	Launchers	Pair of WR-05 Std gain horn antenna (140-220 GHz) • Must be Compatible with the waveguide flange (S.no. 31) • Must be provided with alignment pins

34.	RF Input power range (in case of extenders are being provided)	10 dBm max.
35.	LO input power range (in case of extenders are being provided)	10 dBm max.
36.	Calibration Kit	Compatible WR-5.1 calibration kit to be provided
37.	Back-up Power Supply	A suitable power backup is to be supplied with the module with at least 30 minutes of backup.
38.	High Gain Lens Horn Antenna	• 2 Nos. of (Rx and Tx) of 140-220 GHz High Gain Lens Horn Antenna to be provided compatible with the extension module or to be provided with suitable adapters as required by the module for connections. • The antennas must have gain > 40dBi • Must convert incoming wave from extender to planar waves
39.	Other Accessories	E- Section , H- Section and Straight section waveguide GSG Calliberation Substarte : for 140 GHz to 220GHz
	Future Upgradability	
40.	Frequency	The system should be upgradable to at least 1100 GHz frequency range
41.	Material Measurement Software	Material measurement software compatibility required to measure εr', εr", tan δ, μr', μr", tan δ and Cole-Cole up to 1100GHz or more
42.	Application Software upgrade	1. The instrument should be compatible with Frequency translating devices like mixer, receiver. 2. Pulsed S-parameters measurement 3. Automatic Fixture Removal or any other suitable method to ensure on-wafer measurement for future
43.	Optical measurement	Must be upgradable to Optical measurement with the provided base unit remaining same
	Warranty /Earlier installations/Service	
44.	Warranty	At least 3 years of warranty over Base Unit & extended Module
45.	Earlier Installations	Vendor Must submit installation certificates/ proof of a minimum 2 successfully executed orders of Sub THz / THz Range VNA (i.e., 100 GHz or above) in other Government Institutions or institutions of Repute in India. Certificates of installations must be submitted as a proof of compliance.
46.	Service and Training	Service must be available in India. A minimum of three-day training sessions is to be provided at CSIR-CSIO during the installation

Note: The vendor must provide documented proof from the OEM in the form of company brochures/ certified letterhead, etc., to ensure compliance with the above specifications.