

INDIAN INSTITUTE OF TECHNOLOGY KANPUR
Department of Electrical Engineering

Enquiry No.: EE/YSC/2016/03

Opening Date: 30th September, 2016

Closing Date/time: 10AM on 17th October, 2016

Sub.: Purchase of High Frequency Vector Network Analyzer

Our organization is an educational institute of the repute and liable to get education discount from manufacturer. Please send sealed quotation, to undersigned, for the same.

There will be two steps in the tender process:

1. Technical specifications with compliance table should be put in one sealed envelope. SPECIFY company name and component number, and attach detailed technical specification for each part/component. Also attach technical brochure from manufacturer.
2. Financial details i.e. budget quotation should be in a separate sealed envelope. This quotation will not be opened if technical details of the product do not match with our specifications.

Specifications:

- Please see technical specifications and compliance table. Mark, whether your system complies or not with the specifications along with details.
- Parent company should be an established company with good number of installations and after sales support in India as well: Attach proof of at least 20 previous orders in India.
- Vendor must provide 3(THREE)-years onsite warranty for all parts/components and servicing.
- Installation charges and training should be included in the quotation.

Technical Specifications and Compliance table:

S. No.	Parameter	Specification
1	Frequency Range	50 MHz to 42 GHz
2	Number of ports	2
3	Number of independent sources	2
4	Connector type	2.4 mm (male), 50 ohm (nominal),
5	Output Power	+8 dBm 50 MHz to 3.2GHz +13 dBm 3.2GHz 10GHz +7 dBm 10GHz 35GHz +4 dBm 35GHz to 42 GHz
6	Minimum Settable Power	- 90 dBm
7	Frequency stability	± 0.05ppm -10°C TO 70°C
8	Frequency resolution	1 Hz
9	Number of measurement points	2 to ≥20,000
10	Directivity,	>40 dB up to 40GHz

		>36 dB above 40GHz
11	Source match	>42dB up to 10GHz >30 dB up to 42GHz
12	Reflection tracking	<0.08 dB & $\pm 0.6^\circ$
13	Load match	>40 dB up to 10GHz >30 dB above 10GHz
14	Transmission tracking	<0.14 dB & $\pm 1^\circ$
15	Dynamic Range (At test port)	>100 dB 50MHz to 1GHz >120 dB up to 42GHz
16	Trace Noise Magnitude (1 kHz IF BW)	0.02 dB 50MHz to 500MHz 0.003 dB 500MHz to 42 GHz
17	Trace Noise Phase (1 kHz IF BW)	1 degree up to 500MHz 0.03 degree above 500MHz
18	Test port noise floor	<-85dBm up to 500MHz <-105dBm, above 500MHz
19	System IF Bandwidth	1Hz to 15MHz
20	Cross Talk	<-85dB 50MHz to 500MHz <-120dB, 500MHz to 35GHz <-115dB above 35GHz
21	Phase Noise @ 1kHz Offset	≤ -85 dBc/Hz @ up to 8 GHz ≤ -70 dBc/Hz @ > above GHz
22	Source Harmonics	<-50dBc up to 2 GHz <-60dBc above 2GHz
23	Maximum safe input power level	+30 dBm and DC 40V
24	Reference level Magnitude range & resolution	± 500 dB & 0.001dB
25	Reference level Phase range & resolution	$\pm 500^\circ$ & 0.01°
26	Source, Receiver Attenuator & Bias Tees	Internal Source & Receiver Attenuator with internal Bias Tees for 2 Ports.
27	P1dB measurement	<u>P1dB as a function of frequency with a single calibration.</u> Measure linear gain, compression gain, input and output power at compression, and also the return loss under compression over the specified frequency range.
28	IMD Measurement	<u>Internal combiners for full frequency range must be included for IMD Measurement capability. Spectrum Analyzer mode must be provided for easier trouble-shooting and seeing the frequency spectrum.</u>
29	Display	Touch screen color display
30	Operating System	Windows 7 or above
31	Standard Calibration kit	<u>2.4mm Electronic calibration kit</u> should be supplied along with <u>male & Female and adaptors</u>
32	Supply Voltage	230V, 50 Hz
33	Material Measurement Upgradable Capability	Vendor must quote <u>Material Measurement Software/Hardware capability</u> for measuring intrinsic electromagnetic properties of dielectric and magnetic materials in a variety of formats: ϵ_r' , ϵ_r'' , μ_r' , μ_r'' .

		<p>Suitable test fixtures must be provided for material measurement. For liquid & Solid measurements and Free Space Measurement.</p> <p>Software should run within in the Network Analyzer & control the VNA and should directly calculate and display the complex permittivity ϵ_r^* (or dielectric constant) and permeability μ_r^*, including the loss factor or loss tangent. Results are displayed as a function of frequency.</p>
34	Future Upgradeable Capability	<p><u>Four ports upgradeability</u> with two independent source & Capability to add multiple external sources.</p> <p><u>Internal four Pulse generators, Internal Pulse Modulator</u> with ON / OFF Ratio 80dB</p> <p>System should be upgradable for <u>Nolinear measurement including X-Parameter</u> on high power devices for modeling and simulation purpose</p> <p><u>Intermodulation distortion measurement with internal combiner with capability</u> to perform measurement with single connection. With variable center frequency, tone spacing and tone power sweep capabilities for measuring inter modulation distortion products of order 2, 3, 5, 7, or 9, and can display the associated intercept points</p> <p>Spectrum analysis capability in the system</p> <p>System should be upgradable for the <u>Active & Hybrid Load pull measurement</u>.</p> <p><u>Frequency upgradable up to 110GHz</u> for network analyzer as well as spectrum analyzer</p> <p>Upgradable for low gain and/or low noise figure unmatched on-wafer devices</p>
35	System capability	<p>System should be compatible with parametric analyzer for DC and RF Measurement.</p> <p>System should be compatible with <u>device modelling software like IC-CAP available in our lab</u>.</p>
36	Power Supply	<p>Two channel <u>remotely controllable / programmable</u> power supply (must be from same company and rated to work with VNA)</p> <ul style="list-style-type: none"> • Channel 1 should support min. 60V • Channel 2 should support min. 30V
37	Warranty & Calibration	Vendor must provide 3 (THREE)-years onsite warranty for all parts/components and servicing.
<p>Parent company should be an established company with good number of installations and after sales support in India as well: Provide proof.</p>		

Note:

1. Your quotation shall contain Authorization Letter from manufacturer specifically for this tender.
2. Quotation must be valid for 90 days.
3. Delivery period should not be more than **10 weeks** and delivery should be at IIT Kanpur or CIP New Delhi.
4. Send complete detail of the product(s) including brochure from manufacturer.
5. Payments terms: 90% on installation and 10% satisfactory report.
6. **IITK is exempted from excise/custom duty. Payment can be made in USD for import.**
7. Price must include all taxes and charges.

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