

**PRASAR BHARATI  
DIRECTORATE GENERAL: ALL INDIA RADIO  
(PLANNING & DEVELOPMENT UNIT)**

**TECHNICAL SPECIFICATIONS OF “VECTOR NETWORK ANALYSER”**

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**N.B. : 1. The tenderer should go through all the clauses of these Specifications carefully and should submit clause by clause compliance .**

**2. Tenders without clause by clause compliance are liable to be rejected**

**(R.K.SAINI)  
Dy. Director Engg. (TD)**

# **SPECIFICATION OF “VECTOR NETWORK ANALYZER”**

## **1. GENERAL:-**

The Vector Network Analyzer shall be used to measure (a) Transmission characteristics (Ratio Measurement): Amplitude, phase, group delay (b) Reflection characteristics: Amplitude, Phase (c) Level Characteristics : Absolute Amplitude. The equipment shall incorporate state of art of technology for measuring Impedance, Return Loss, SWR etc of feeder line, measuring impedance of filter network of high quality broadcast transmitter of All India Radio etc. The equipment should have facility of sweep and spot measurement for operational convenience. The equipment should be fully solid state, self contained, compact, easy to set up, simple to use, rugged for using continuously for 24x7 hrs. basis. The equipment should be capable to display all measurements directly without the need of adjustments, tuning etc. The equipment shall have USB interface and PC, Printer connectivity etc.

**N.B.: Tenderer should clearly mention Make & Model No. of the equipment offered supported by printed technical manual/leaflet.**

## **2. TECHNICAL SPECIFICATIONS :-**

### **2.1. FREQUENCY:-**

Range : 10 KHz to 300 MHz  
Resolution : 1.0 Hz

### **2.2 ACCURACY (STANDARD):-**

Aging rate :  $\leq 1 \times 10^{-6}$  per year  
Temperature characteristics:  $\leq \pm 5 \times 10^{-6}$  (0° to +50°C)

### **2.3. TEST PORT INPUT:-**

No. of Test Port : Two  
Impedance : 50  $\Omega$   
Input range : 0dBm to +20dBm  
Max. Continuous RF input power : AC: +20dBm, DC:  $\pm 2.2$  V  
Connector : N type/BNC-J, to be specified by the tenderer.  
Probe with protective circuit against RF pickup for measurement on large DUTs in high R.F. Field : To be specified by the tenderer.

### **2.4. TEST PORT OUTPUT:-**

No. of Ports : Two  
Output Impedance : 50  $\Omega$   
Power Range : -50dBm to +10dBm  
Impedance transformation unit with adopter etc, to connect large unbalance DUTs\* of

impedance 120  $\Omega$  & 230  $\Omega$  : Adapter unit alongwith it's probe/cable.  
Output resolution : Better than 1.0 dB.  
Connector : N type/BNC-J, to be specified by the tenderer.

\*Open wire R.F Feeder lines of AIR Transmitter centre.

### **2.5. AMPLITUDE MEASUREMENT:-**

Measurement range :  $\geq 115$  dB  
Measurement resolution : 0.001 dB  
Dynamic accuracy : Better than  $\pm 1$ dB up to -80dB for 10KHz to 300MHz

### **2.6. PHASE MEASUREMENT:-**

Measurement range :  $\pm 180^\circ$   
Measurement resolution : 0.001 $^\circ$   
Dynamic accuracy : Better than  $\pm 6.0^\circ$  upto -80dB for 10KHz to 300MHz

**2.7. AVERAGE NOISE LEVEL:-**  $\leq -120$ dBm (RBW:1 KHz, 10 KHz to 300 MHz)

### **2.8. GROUP DELAY MEASUREMENT:-**

Aperture : 0.25% to 20% of frequency span  
Accuracy (in seconds) : It should be at least or better than the accuracy, determined by the following formula-  
=  $\frac{\text{Phase Accuracy (degrees)}}{360^\circ \times \text{Aperture (Hz)}}$

### **2.9. CROSS TALK:-**

Between Channels : Better than 110 dB  
Between Transmitter & Receiver : Better than 125 dB

**2.10. SELF CALIBRATION, CORRECTION:-** To be specified by the tenderer.

### **2.11. SWEEPING:-**

Frequency sweep : LIN (CENTER/SPAN, START/STOP), LOG (START/STOP)  
Level sweep : LIN (START/STOP/STEP)  
Sweep time : To specified by the tenderer  
Sweep time Range : 2.5 ms to 16000 sec.

### **2.12. DISPLAY:-**

Max. Display screens : 2 channels, 4 traces  
Display : 640 x 480 Pixels (minimum), colored TFT/LCD

### **2.13. MARKERS:-**

Nos. of Markers : Minimum FOUR  
Marker functions : MIN, ?MAX, MKR  $\rightarrow$  ?MKR, 0 MKR, MKR  $\rightarrow$  ?NORMAL  
MKR,  $\Delta$

Setting : -PEAK, ?+PEAK, MKR →?CF, MKR →?MKR →  
MKR TRACK + PEAK, MKR TRACK-PEAK, MKR CHANGE,  
MKR OFFSET  
: Set marker position to frequency or point.

#### **2.14. AUXILIARY MEDIA:-**

Saving/recalling data : Measurement Parameters, measured data, calibration data etc to and from internal memory / external memory.

Function Memory : To be specified by the tenderer.

Capacity : To be specified by the tenderer. In case of flash memory, the capacity should be minimum 1GB

**2.15. PRINTING: -** Printer Interface to be provided

#### **2.16. EXTERNAL REFERENCES:-**

Input Frequency : 10 MHz

Input Prog. Level : 0dBm to +10dBm

Input impedance : (connector: BNC-J) 50 Ω

Reference oscillator-

Output Frequency : 10 MHz

Output Power : 0dBm minimum

External trigger input : TTL Compatible (connector: BNC-J) 50 ohm

GPIB : IEEE488.2 (24-pin Amphenol connector)

**2.17. POWER SUPPLY: -** 230 V ±10%, 50 Hz ± 2Hz.

**2.18. DIMENSIONS AND MASS: -** To be specified by the tenderer

#### **2.19. ENVIRONMENTAL CONDITIONS:-**

Temperature range : -30° to +50°C

Humidity : 95% Non-condensing.

Altitude : 3000mtrs.

#### **2.20. EMC:-**

In line with European EMC Directive 89/336/EEC and EMC Directive 2002/108/EC including:

- IEC/EN 61326 Class A (Emission)
- CISPR 11/EN 55011/Group 1 Class A (Emission)
- IEC/EN 61326 Table A.1 (Immunity, Industrial)

**2.21. EMI FILTERS:** - 6dB bandwidths: 9 KHz, 120 KHz, 1 MHz.

**3. GUARANTEE:-**

The equipment shall be guaranteed against manufacturing/design defect, satisfactory and trouble free operation for a minimum period of one year from the date of receipt by AIR in satisfactory working condition.

**4. SPARES:-**

Essential and recommended spares (discreet and modules) shall be quoted separately for keeping the instrument in working condition for at least 10 years.

**5. SERVICING FACILITY:-**

The tenderer shall specify the repair/service facility available for the equipment in India with address, Phone/Fax nos. etc.

**6. DELIVERY PERIOD:-**

Supply of the equipment shall be completed within 6 months from the date of supply order issued.

**7. INSTRUCTION MANUAL:-**

Two copies of operating instruction and service manual shall be supplied alongwith each equipment. Four extra copies will be supplied to Director Engg. (Transmitter design Section), P & D Unit, DG: AIR, New-Delhi.

**8. ACCESSORIES:-**

**Standard Items:** The equipment shall be supplied complete with all necessary accessories such as connectors, power supply cord and probe kit consisting of probe, spare pins and clips, BNC adopter, component mounting adopter, probe socket and accessories case and transportation case of the equipment. Probe length should not be less than 2 meter.

**Optional Items:-** Optional accessories shall also be quoted by tenderer.

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