

Technical specifications for Dielectric permittivity measurement kit for thin layers

Required mandatory specifications (all the conditions should be met)

S.No.	Parameter	Description
1	Operating frequency	200 MHz – 20 GHz
2	Measurement accuracy	< 3%
3	Measurement repeatability	within $\pm 1\%$
4	Samples	thin material layers, sheets and foils in millimeter and sub-millimeter range, liquids in small quantities (0.5 – 50 ml)
5	Control	Control over force applied on soft samples
6	Force measurement range	0 – 1000 N
7	Sample thickness measurement range	0.1 – 10 mm
8	Sample thickness Measurement Precision	< 0.003 mm
9	Metal petri-dish	for liquids
10	VNA cable	High Precision 1 m long 3.5 mm 26 GHz cable
11	Extendable measurement range	1) lower the measurement range to 10 MHz, 2) increase the measurement range to 67 GHz
12	Calibration standards	for permittivity measurement
13	Compatibility	with ENA5071C vector network analyzer (VNA) from Keysight Technologies
14	Compatibility with third party VNAs	Keysight technologies, Rohde & Schwarz, Cobalt
15	Operating Temperature Range	10 – 50 °C

16	Measurement software	GUI for data collection, analysis, storage and display
17	Measurement mode	Fully automated and software controlled
18	Data formats and file saving options	Raw and calibrated scattering parameter measurements, permittivity measurements
19	Software drivers	<ul style="list-style-type: none"> • Software should be freely able to communicate with PC/workstation with MS-windows 10 or higher operating system. • A free license for the system software should be provided with the equipment. • License for both machine control and processing software should be included with the system.
20	Documentation requirement The following documentations should be provided (one set of each in English)	<ul style="list-style-type: none"> • Operation manual • Software instruction manual • Maintenance, troubleshooting and safety guidelines manuals • Manuals to handle accessories and guidelines • Occupational Health and Safety (OHS) guidelines and warnings
21	Inspection, installation, commissioning and training	<ul style="list-style-type: none"> • All the essential requirements ensuring a ready-to-use set up at IIT Madras should be supplied. • Comprehensive training for research fellows/students should be imparted upon installation
22	Warranty	<ul style="list-style-type: none"> • Minimum warranty for 3 years • Possibility of extending the warranty beyond the mandatory period should be clearly mentioned with the appropriate cost. • Bidder should have provision for a continuous Annual Maintenance Contract upon the completion of warranty period
22	Provision for software upgrade	Upgrades for GUI and permittivity measurement algorithms
23	External interface with computer/laptop	USB Connector

24	Equipment calibration certificate	Specify ISO/IEC standards
25	Spares, consumables, mandatory accessories and standard feedstocks	<ul style="list-style-type: none"> • Bidder should offer a list of essential spare parts and accessories with their part numbers • Bidder should also ensure that the spare parts and accessories should be made available to procure for a smooth operation over at least 10 years from the date of installation
26	Additional deliverables	<ol style="list-style-type: none"> 1. Benchtop equipment with provision for connection to VNA and computer/laptop 2. Precision 1 m long 26 GHz cable with 3.5 mm connector 3. USB cable 3 m long 4. Calibration standard kit 5. User manual for programming 6. Operating manual 7. Installation and demonstration of the unit

Additional mandatory requirements:

- Proof of technical competency with at least three similar equipment supplied, installed, maintained, within three years which are currently working shall be submitted along with the offer (IISc/IITs/IISER/NITs/Central Universities/DRDO/CSIR and other government Labs).
- A detailed compliance statement, clearly indicating the compliance (or deviation) against each technical specification to above mentioned specifications should be provided along with technical and financial quotes.
- Financial bids should be provided as a modular bid with a list price for each and individual item. Price should be in CIF Chennai.