



**FOUNDATION FOR TECHNOLOGY AND BUSINESS INCUBATION (FTBI)
NATIONAL INSTITUTE OF TECHNOLOGY
ROURKELA – 769 008, ORISSA**

Advertised Tender Enquiry

Department: FTBI

Tender notification no: - NITR/PW/FTBI/MCL/2020/199

Date: 29/09/2020

To,

Important Dates

Through,
CPP Portal
(e-procurement)

Event	Date	Time
Pre-bid Conference	NA	NA
Last Date of submission of bid	21/10/2020	11:00 AM
Date of opening of techno-commercial bid	22/10/2020	11:00 AM

Dear Sir,

We intend to purchase the commodities specified below and invite quotations in accordance with the terms and conditions detailed in the bid document. If you are interested, kindly send your offer with prices and complete terms within the time mentioned above.

For any clarification:

ATTENTION:

PIC (FTBI): **Prof. Debayan Sarkar**
FOUNDATION FOR TECHNOLOGY AND
BUSINESS INCUBATION, (TIIR)
NATIONAL INSTITUTE OF TECHNOLOGY
ROURKELA – 769 008, ODISHA
Phone: 0661 – 246 2230 / 2231
E-mail: ftbi@nitrkl.ac.in , sarkard@nitrkl.ac.in

Yours sincerely,

Name: Prof. Debayan Sarkar
PIC (FTBI)

Encl:

- (1) Schedule of requirement, specifications, dates etc.**
- (2) Bid document containing detail terms and conditions.**

1. Schedule of requirements

Item No	DESCRIPTION	Quantity
1	IoT/Makers' Laboratory Equipments & Machines	As per Annexure-I

2. Specifications and allied Technical Details

* Attach Annexure-I

3. Format of Quotation (tick appropriate box)

It is a two part bid with separate techno-commercial and price bids.

4. The bid should be submitted through <https://eprocure.gov.in/eprocure/app>

5. Quotations should be valid for a period of **90 days** from the date of opening of techno-commercial bid.

6. Some important dates:

i. Pre-bid Conference	Date: NA	Time: NA
ii. Last date for submission of Bid:	Date: 21/10/2020	Time: 11:00 AM
iii. Date of opening of techno-commercial bid:	Date: 22/10/2020	Time: 11:00 AM

7. Warranty of minimum one year or six months must be provided.

8. GST: GST should be charge according to applicable rates.

9. Bid Security and Tender Cost: Bid Security in shape of Bank Guarantee/DD (Demand Draft) for **INR 94,000/- (Rupees Ninety four thousand Only)** and Tender Cost (Non-refundable) in the form of DD for **INR 500/- (Rupees Five Hundred Only)** in favor of **Director, NIT Rourkela** Payable at Rourkela from any Scheduled Commercial Bank except Co-operative and Gramin bank. And Bank Guarantee/DD for the Bid-Security should remain valid for a period of **45 days** beyond the bid validity period from the date of opening of bids. Bid security of unsuccessful bidders should be return to them at the earliest and latest on or before the **30th days** after the award of the contract. **EMD (Earnest Money deposit)** and **Tender Cost** should reach physically through speed post/ register post/courier, containing in an envelope & superscripted with subject, tender reference number addressing to **Registrar, NIT Rourkela- 769008, Odisha**; Attention: PIC(FTBI) on or before **22/10/2020 at 11:00 AM**

10. Performance Security: (See Item 2.10 of instructions): In shape of Bank Guarantee/DD (Demand Draft) of **Rs. 2,35,000/- (Rupees Two lakh thirty five thousand only)** in favor of **Director, NIT Rourkela** Payable at Rourkela from any Scheduled Commercial Bank except Co-operative and Gramin bank.

11. Techno-commercial Bid Evaluation Criteria: As per the detailed equipment technical specifications given in Annexure –I. If required, the bidder may be asked to provide clarification regarding the technical aspects.

Other Qualification criteria:

- i. Complete technical specification of the instruments and its necessary parts and accessory items required for running the instrument.
- ii. A complete design along with the clear indication/markings of the specification mentioned in the technical bidding document (wherever possible) of the instrument.
- iii. Make, model and specification of the list of equipment as mentioned in schedule of requirement.
- iv. Scanned copy of the technical brochure and website reference of the same must be included in the bid.
- v. There must be a local maintenance center with the availability of the spares in India.
- vi. A declaration from the Principal stating that the spares will be made available for the equipment for at least 2 years from the date of installation.
- vii. 3 numbers of Scanned copy of PO (not older than 7 years) of similar or higher specification supplied within India (at least ONE from premier Government Institution and R & D Organization).
- viii. A duly signed detailed User List (at least 5) with the concerned person's valid contact details, in India where the instrument is still in the operational condition must be provided.
- ix. A copy of the Authorization Certificate issued by the Principal in favour of the Indian agent along with a certified copy of the Agency Agreement between the foreign Principal and Indian agent. Both these certificates must be up-to-date.(if applicable)
- x. A letter in the official letterhead of the principal declaring the Indian agent as their authorized agency to bid contain the official tender enquiry number as depicted in the CPP portal, must be included with the technical bid. (This must not be clubbed with Authorization Certificate)
- xi. A duly signed separate compliance sheet of the specification (at every point) mentioned in the technical part along with the deviation (if any). This compliance sheet will not be considered as the technical specification of the instrument.
- xii. Each bidder has to mandatorily quote for all the items as mentioned in BOQ.

12. Financial Bid Evaluation Criteria: The comparison will be made for the award of contract on the overall price basis.

13. Please go through the enclosed "bid document" carefully for other bidding instructions.

14. Please send your quotations through <https://eprocure.gov.in/eprocure/app>

15. For technical details, you may contact

Prof. Debayan Sarkar
FOUNDATION FOR TECHNOLOGY AND BUSINESS INCUBATION,
(TIIR)
National Institute of Technology,
Rourkela - 769 008
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E-mail: ftbi@nitrkl.ac.in, sarkard@nitrkl.ac.in



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BID DOCUMENT

1. Instructions to the bidders

- 1.1 Bids are invited on behalf of the Director, National Institute of Technology (NIT), Rourkela – 769 008, Odisha, from the intending bidders for supply of the goods/stores/ equipment for the Institute as detailed in the enquiry letter.
- 1.2 The bidders should quote their offer/rates in **BOQ** in clear terms without ambiguity.
- 1.3 In case of any discrepancy between the rates in figures and that in words, the rate in words will be accepted as correct.
- 1.4 The last date for receipt of the bid is marked in the enquiry.
- 1.5 The bids should be uploaded in <https://eprocure.gov.in/eprocure/app> Please follow the guidelines of the site.
- 1.6 If a prospective bidder requires any clarification in regard to the bidding documents, he may make a request the concerned officer or faculty member at least 15 days before the deadline for receipt of bids.
- 1.7 Each bidder shall submit only one bid. A bidder, who submits more than one bid, shall be disqualified and considered non-responsive.
- 1.8 (In respect of high value plant, machinery etc. of a complex and technical nature). The bids may be submitted in two parts, viz., technical bid and financial bid.
- 1.9 The bidder has to sign in full at all pages of the scanned part of the bidding document. No over-writing in those pages is acceptable.
- 1.10 Partial submission of bid is not permitted. Bidders should apply for all items.
- 1.11 Bidders registered with any of the following agencies/ bodies as per Public procurement policy for Micro & Small Enterprises (MSE) order 2012 are exempted categories from payment of EMD provided that the registration Certificate issued by any one of these below mentioned agencies must be valid as on close date of tender. Micro small or medium enterprises who have applied for registration or renewal of registration with any of these agencies/bodies but have not obtained the valid Certificate as on close date of tender are not eligible for exemption.
 - i) Khadi and Village Industries Commission (KVIC)
 - ii) National Small Industries Corporation (NSIC)
 - iii) Any other body specified by Ministry of MSME/GOI

2. Conditions of the bid

- 2.1 The rates quoted should preferably be net, inclusive of all taxes and duties, packing, forwarding, freight, Insurance and all other incidental charges. In case these charges are quoted extra in addition to the quoted rates, the amount thereof or Ad Valorem rate must be specified. Packing, forwarding, freight etc., when quotes separately are reimbursable at actuals. If external agencies are employed, their receipts must be enclosed with the invoice.

- 2.2 Duties and Taxes are to be quoted separately. Ad Valorem rates thereof should be clearly indicated with reference to the relevant Acts and Rules.

It may be noted that the Institute is availing custom duty exemption in terms of Notification No. 51/96 – Customs dt. 23.07.1996, Notification No. - 47/2017- Integrated Tax (Rate) dt. 14.11.2017 and Notification No- 45/2017 – Integrated tax (Rate) dt. 14/11/2017 & Notification No. - 45/2017- Central tax (Rate) dt. 14.11.2017, Notification No. - 45/2017- Union Territory Tax (Rate) dt. 14/11/2017 [Vide DSIR, Ministry of Science and Technology, Government of India, Registration No.: TU/V/RG- CDE (227)/2016, dated: 13.11.2018]

- 2.3 The goods are required to be delivered at the indenting Department of NIT, Rourkela, and must be reached within **60 days** from the date of placement of the supply of order under the risk and arrangement of the bidder and offers with delivery beyond the above period shall be treated as unresponsive. In case the delivery time is higher, the same must be mentioned clearly in the quotation.
- 2.4 The bid should remain valid for a period of **90 days** from the date of opening. In case your offer has a different validity period that should be clearly mentioned in the quotation.
- 2.5 Conditional discount, if any, offered by the bidder shall not be considered at the time of evaluation.
- 2.6 The goods offered should strictly conform to the specification and technical details mentioned in **Annexure-I**.
- 2.7 The Institute may like to conduct pre-dispatch inspection of goods, where applicable.
- 2.8 Period of guarantee/warranty, where applicable, should be specified in the bid.
- 2.9 If the successful bidder, on receipt of the supply order, fails to execute the order within the stipulated period, in full or part, it will be open to the Director, NIT, Rourkela to recover liquidated damage from the firm at the rate of 1 percent of the value of undelivered goods per month or part thereof, subject to a maximum of 5 percent of the value of undelivered goods. Alternatively, it will also be opened to the Director, to arrange procurement of the required goods from any other source at the risk and expenses of the bidder.
- 2.10 The successful bidder has to furnish "Performance Security" for an amount specified in the enquiry, in the form of Account Payee Demand Draft/or unconditional Bank guarantee en-cashable on demand from the Director, NIT, Rourkela, from a Commercial Bank with validity period of sixty days beyond the date of completion of all contractual obligations of supplier including guarantee/warranty obligations. The Performance Security is to be furnished in favour of the Director, National Institute of Technology, Rourkela, within ten days of intimation, failing which his bid security will be forfeited.
- 2.11 The successful bidder may be required to execute a contract, where applicable.
- 2.12 The bidder has to furnish up to date GST and Income Tax Clearance Certificate along with the bid.
- 2.13 Payment (100 percent) will be made by Account Payee Cheque /Bank Draft, within 30 days from the date of receipt of the goods in good condition or receipt of the bill, commissioning of the equipment, and after successful installation and demonstration where ever applicable, whichever is later/latest.
- 2.14 In case of Advance payment, the payment will be made on either in Foreign Demand Draft or Wire Transfer only. The proforma invoice copy need to be sent for advance payment.

- 2.15 In the event of any dispute arising out of the bid or from the resultant contract, the decision of the Director, NIT, Rourkela shall be final.
- 2.16 The bid document/resultant contract will be interpreted under Indian Laws.
- 2.17 Partial submission of bid is not permitted. Bidders should apply for all items.

IoT/Makers' Laboratory Equipments & Machines

Sr. No.	Equipment Name and Specification	Quantity																																				
1	<p>High Precision Manual Solder Paste Printer</p> <table border="1" data-bbox="252 322 1283 779"> <tr> <td>Max Frame Size</td> <td>500MM X 400MM</td> </tr> <tr> <td>Max PCB size</td> <td>260MM X 360MM</td> </tr> <tr> <td>Screen Stencil Size</td> <td>260MM X 360MM</td> </tr> <tr> <td>PCB Thickness</td> <td>0.5mm – 10mm</td> </tr> <tr> <td>Platform Height</td> <td>190MM</td> </tr> <tr> <td>Repeatability</td> <td>Plus or minus 0.01mm</td> </tr> <tr> <td>Fine Adjustment Range</td> <td>Z – axis plus or minus15mm X-axis plus or minus15mm Y – axis plus or minus15mm</td> </tr> <tr> <td>Positioning Pin Size</td> <td>1mm , 1.5mm , 2.0mm, 2.5mm & 3mm</td> </tr> <tr> <td>Overall Dimensions</td> <td>660 x 470 x 245mm</td> </tr> <tr> <td>Net Weight</td> <td>11.55kg</td> </tr> <tr> <td>Gross Weight</td> <td>14.0 kg</td> </tr> </table>	Max Frame Size	500MM X 400MM	Max PCB size	260MM X 360MM	Screen Stencil Size	260MM X 360MM	PCB Thickness	0.5mm – 10mm	Platform Height	190MM	Repeatability	Plus or minus 0.01mm	Fine Adjustment Range	Z – axis plus or minus15mm X-axis plus or minus15mm Y – axis plus or minus15mm	Positioning Pin Size	1mm , 1.5mm , 2.0mm, 2.5mm & 3mm	Overall Dimensions	660 x 470 x 245mm	Net Weight	11.55kg	Gross Weight	14.0 kg	01														
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		protocols analyse: CAN/LIN	
		protocols analyse: I2C, SPI, UART	
	Standard equipment	mains cable, manual (CD), oscilloscope probe (1 per channel), probe GTL-16E	
	Interface	LAN, USB	
4	DC Power Supply		01
	4 Independent Isolated Output	Out Puts : CH 1 & 2 : 0-32V/3A CH 3 : .0- 5 V/1A CH 4 : 0 – 15 V/1A	
	Constant Voltage Mode	Line Regulation : $\leq 0.01\% + 3mV$ Load Regulation : $\leq 0.01\% + 3mV$ Ripple & Noise : 1mVrms	
	Constant Current Mode	Line Regulation : $\leq 0.2\% + 3mA$ Load Regulation : $\leq 0.2\% + 3mA$ Ripple Current : $\leq 3mArms$	
	Safety Operations	Output ON/OFF Switch required	
	Displays	Four Different Displays required	
	Display Size	4.3 Inch LCD Display	
	Other Features	Tracking Operation and Auto Series/Parallel Operation required	
	Supply	230 V AC / 50 hz	
	Standard accessories	User manual, Power cord & test leads 4 nos.	
5	Function Generator		01
	Technology	DDS Technique and FPGA Chip Design with Digital Key pad	
	Frequency Range	0. 1Hz ~ 3MHz	
	Output Function	Sine, Square, Triangle, TTL	
	Amplitude Range	2mVpp~10Vpp (50Ω load)	
	Impedance	50Ω ± 10%	
	Attenuator	-40dB ± 1dB x1	
	DC Offset	< -5V ~ >+5V (50Ω load)	
	Duty Range	25% ~ 75%, ≤1MHz (Square Wave)	
	Display	6 digits LED display	
	Sine/Square Waveform Range	0.1Hz ~ 3MHz	
	Triangle Waveform Range	0.1Hz ~ 1MHz	
	Low Distortion Sine Wave	-55dBc, 0.1Hz~200kHz	
	Resolution	0.1Hz maximum	
	Stability	±20ppm	
	Accuracy	±20ppm	
	Aging	±5ppm/year	
	Cursor selection	Cursor (frequency editing point) left or right. facility for Accurate frequency setting	
	Output Control	Out Put with ON/OFF selector	
	Standard accessories	BNC – crocodile x 1 , Mains cord	

6	<p>LCR Meter</p> <table border="1"> <tr> <td data-bbox="209 143 555 215">Display</td> <td data-bbox="555 143 1225 215">Main Display: 20,000/2,000 counts selectable Sub Display: 2,000 counts</td> </tr> <tr> <td data-bbox="209 215 555 248">Test Frequency</td> <td data-bbox="555 215 1225 248">100/120Hz/1/10/100kHz</td> </tr> <tr> <td data-bbox="209 248 555 300">Accuracy</td> <td data-bbox="555 248 1225 300">0.2% Basic Accuracy</td> </tr> <tr> <td data-bbox="209 300 555 338">Measurement Parameter</td> <td data-bbox="555 300 1225 338">L,C,R,D,Q,ESR,θ,DCR</td> </tr> <tr> <td data-bbox="209 338 555 748">Features</td> <td data-bbox="555 338 1225 748"> <ul style="list-style-type: none"> • Auto LCR Mode for DUT Measuring Require • Parallel/Series Testing Mode required • Sorting Mode for Quality Control required • 2Wire or 5Wire Measurement required • Data Hold and Zero Mode Supported required • Auto Range, Auto Backlit required • Low Battery Indication required • Auto Power off required </td> </tr> <tr> <td data-bbox="209 748 555 1216">Accessories</td> <td data-bbox="555 748 1225 1216"> Shorting Cube 2Wire Alligator Clip Set Magnetic Hang Kit Battery User Manual SMD Test Probe AC Adapter USB Cable PC Software CD </td> </tr> </table>	Display	Main Display: 20,000/2,000 counts selectable Sub Display: 2,000 counts	Test Frequency	100/120Hz/1/10/100kHz	Accuracy	0.2% Basic Accuracy	Measurement Parameter	L,C,R,D,Q,ESR, θ ,DCR	Features	<ul style="list-style-type: none"> • Auto LCR Mode for DUT Measuring Require • Parallel/Series Testing Mode required • Sorting Mode for Quality Control required • 2Wire or 5Wire Measurement required • Data Hold and Zero Mode Supported required • Auto Range, Auto Backlit required • Low Battery Indication required • Auto Power off required 	Accessories	Shorting Cube 2Wire Alligator Clip Set Magnetic Hang Kit Battery User Manual SMD Test Probe AC Adapter USB Cable PC Software CD	01																																													
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7	<p>Digital Multimeter</p> <table border="1"> <tr> <td colspan="3" data-bbox="209 1339 1337 1373">Benchtop DMM required with high precision and battery operated</td> </tr> <tr> <td colspan="3" data-bbox="209 1373 1337 1406">Instrument should measure frequency and capacitance</td> </tr> <tr> <td colspan="3" data-bbox="209 1406 1337 1440">Special Functions like auto/manual range , True RMS, Analog bar should be available</td> </tr> <tr> <td data-bbox="209 1440 855 1491">Parameter</td> <td data-bbox="855 1440 1166 1491"></td> <td data-bbox="1166 1440 1337 1491">Precision</td> </tr> <tr> <td data-bbox="209 1491 632 1525">DC Voltage Range</td> <td data-bbox="632 1491 855 1525">1000V</td> <td data-bbox="1166 1491 1337 1525">$\pm(0.1\%rdg + 2 \text{ digits})$</td> </tr> <tr> <td data-bbox="209 1525 632 1559">AC Voltage Range</td> <td data-bbox="632 1525 855 1559">750V</td> <td data-bbox="1166 1525 1337 1559">$\pm(0.8\%rdg + 10 \text{ digits})$</td> </tr> <tr> <td data-bbox="209 1559 632 1592">DC Current Range</td> <td data-bbox="632 1559 855 1592">10A</td> <td data-bbox="1166 1559 1337 1592">$\pm(0.5\%rdg + 10 \text{ digits})$</td> </tr> <tr> <td data-bbox="209 1592 632 1626">AC Current Range</td> <td data-bbox="632 1592 855 1626">10A</td> <td data-bbox="1166 1592 1337 1626">$\pm(0.8\%rdg + 10 \text{ digits})$</td> </tr> <tr> <td data-bbox="209 1626 632 1659">Resistance</td> <td data-bbox="632 1626 855 1659">220MΩ</td> <td data-bbox="1166 1626 1337 1659">$\pm(0.5\%rdg + 10 \text{ digits})$</td> </tr> <tr> <td data-bbox="209 1659 632 1693">Capacitance</td> <td data-bbox="632 1659 855 1693">220mF</td> <td data-bbox="1166 1659 1337 1693">$\pm(3.0\%rdg + 5 \text{ digits})$</td> </tr> <tr> <td data-bbox="209 1693 632 1727">Frequency</td> <td data-bbox="632 1693 855 1727">220MHz</td> <td data-bbox="1166 1693 1337 1727">$\pm(0.01\%rdg + 5 \text{ digits})$</td> </tr> <tr> <td data-bbox="209 1727 632 1760">Interface</td> <td data-bbox="632 1727 855 1760">RS 232C</td> <td data-bbox="1166 1727 1337 1760">With Software</td> </tr> <tr> <td colspan="3" data-bbox="209 1760 1337 1794">Instrument should have Data Hold/Relative Mode facility</td> </tr> <tr> <td colspan="3" data-bbox="209 1794 1337 1827">Continuity Beeper: Buzzer sounds if conductance less than 10Ω</td> </tr> <tr> <td colspan="3" data-bbox="209 1827 1337 1861">Duty cycle (%) mode available</td> </tr> <tr> <td colspan="3" data-bbox="209 1861 1337 1895">Display:LCD:22000 counts</td> </tr> <tr> <td colspan="3" data-bbox="209 1895 1337 1928">Power Source: Single 9V Battery (6F22)</td> </tr> <tr> <td colspan="3" data-bbox="209 1928 1337 1962">Weight: not more than. 370g</td> </tr> <tr> <td colspan="3" data-bbox="209 1962 1337 1995">Accessories: User manual , Test leads, Battery</td> </tr> </table>	Benchtop DMM required with high precision and battery operated			Instrument should measure frequency and capacitance			Special Functions like auto/manual range , True RMS, Analog bar should be available			Parameter		Precision	DC Voltage Range	1000V	$\pm(0.1\%rdg + 2 \text{ digits})$	AC Voltage Range	750V	$\pm(0.8\%rdg + 10 \text{ digits})$	DC Current Range	10A	$\pm(0.5\%rdg + 10 \text{ digits})$	AC Current Range	10A	$\pm(0.8\%rdg + 10 \text{ digits})$	Resistance	220M Ω	$\pm(0.5\%rdg + 10 \text{ digits})$	Capacitance	220mF	$\pm(3.0\%rdg + 5 \text{ digits})$	Frequency	220MHz	$\pm(0.01\%rdg + 5 \text{ digits})$	Interface	RS 232C	With Software	Instrument should have Data Hold/Relative Mode facility			Continuity Beeper: Buzzer sounds if conductance less than 10 Ω			Duty cycle (%) mode available			Display:LCD:22000 counts			Power Source: Single 9V Battery (6F22)			Weight: not more than. 370g			Accessories: User manual , Test leads, Battery			01
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EMC Pretest Solution

- ✓ GSP - 9330 Spectrum Analyser
- ✓ GIT – 5060 Isolated transformer
- ✓ GLN – 5040A LISN
- ✓ GPL – 5010 Transient Limiter
- ✓ GKT – 008 EMI near field probe kit
- ✓ DC Block: ADD – 008

EMI / EMC Pre Test Solution Quantity 01 no each of following

Receiver 3.2 GHZ SPECTRUM ANALYZER with DC block

(LISN) LINE IMPEDENCE STABILIZATION NETWORK

ISOLATED TRANSFORMER FOR LISN

TRANSIENT LIMITER

EMI NEAR FILED PROBE

Features

- Frequency Range: 9kHz ~ 3.25GHz
- 0.025ppm Frequency Stability and 1ppm aging Rate
- RBW: 1Hz ~ 1MHz (3dB), 6dB EMI Filter: 200Hz, 9kHz, 120kHz, 1MHz
- Fastest sweep time: 204us, Sensitivity: -149 dBm/Hz (@PreAmp on)
- Built-in Preamplifier, 50dB Attenuator, and Sequence Function
- Built-in EMC pretest function, Quasi-Peak/Average EMI detect mode
- Built-in 2FSK Analysis, AM/FM/ASK/FSK Demodulation & Analysis
- Built-in P1dB point, Harmonic, CHPW, OCBW, ACPR, SEM, TOI, CNR, CTB, CSO, N-dB bandwidth, Noise Marker, Frequency Counter, TDP, Gated Sweep
- Built-in Spectrogram, Topographic and Split-Window Display Modes
- Remote control EMI measurement software: SpectrumShot
- Remote Control Interface: LAN, USB, RS-232

EMI Pretest Solution**a. EMI Near Field Probe Set**

Probe should have a high sensitivity to quickly analyze a source of noise. The probe can be used with the dedicated EMI Pretest function on the spectrum analyzer Receiver .

When used with the default pre-amplifier function, the sensitivity of the EMI probe can be significantly enhanced to distinguish subtle noise.

Magnetic Field Probe

The magnetic field probe should analyze and diagnose the problems listed below:

- Spatial noise of the device and equipment
- Spatial noise of PCB boards
- PCB trace and component radiated noise
- Cable and wire radiated noise
- Confirmation of shielding effectiveness

Electric Field Probe

The electric field probe should analyze and diagnose the problems listed below:

- Ground and power noise
- PCB trace conducted noise
- IC pin output noise
- I/O pin output noise
- Confirmation of filter effectiveness

EMC Pretest Solution**b. Line Impedance Stabilization Network**

Two Line V-Network is used for EMI testing. It provides a stable impedance for the EUT terminals and the reference ground within the conducted emissions range. LISN should isolates the unwanted network signals from the power supply unit and only couples the disturbance voltage of the measured device to the receiver. The product's performance is in compliance with the standard requirements of CISPR16-1-2 for V-networks with a simulated impedance of $50\mu\text{H} + 5\ \Omega \parallel 50\ \Omega$ in the frequency range of 9kHz to 30MHz.

c. Isolated transformer

For conduction measurements, there is a lot of leakage current due to the nature of the artificial mains network design principal. The network must be well grounded, otherwise a potential safety hazard may exist. For actual measurements, isolated transformers are always needed to avoid dangerous conditions. With a 900VA operation capacity, 5A current limit with a built-in air switch, the isolated transformer is able to meet most measurement requirements.

d. Transient Limiter

Transient limiter is commonly used to test electromagnetic interference. For EMI testing, when accidentally overloaded, it can protect the terminal circuit and the valuable EMI test equipment. Meanwhile, together with Two Line V Network, they constitute a complete EMI test system.

9.

Lora Tester

CPU	ARM 32bit-Cortex-M3 kernel; Main frequency: 32MHz
Memory	128KB Flash 16KB RAM 4KB EEPROM
Sensor	built-in GPS
Buzzer	Built-in
LED indicator	1x power indicator, red 1x charging indicator, green
Antenna	External LoRa antenna, Built-in GPS ceramic antenna
Data rate	300bps~5.4Kbps
Working frequency	470MHz~510MHz 863MHz~870MHz 902MHz~928MHz
Protocol	Support LoRaWAN
Maximum transmitted power	17dbm
Rx sensitivity	-140dBm
Overall power consumption	110mW
Battery capacity	3.7V/3500mAh
Working temperature	-20°C~70°C
Working humidity	10%~90%
Power supply	built-in rechargeable lithium battery
Input voltage	DC3.7V
Transmit status	150mA
IP grade	IP65
Dimension	190*86*30mm

10	<p>Digital Clamp Meter</p> <table border="1"> <tr> <td data-bbox="209 163 480 286">Features</td> <td data-bbox="480 163 1241 286"> <ul style="list-style-type: none"> • Equipped to measure both AC and DC current with transformer jaws of large diameter. • Can measure AC and DC currents up to 2000A. • Output terminal for connection to recorders. </td> </tr> <tr> <td data-bbox="209 286 480 472">AC A</td> <td data-bbox="480 286 1241 472"> 400A/2000A (0 - 1000A) $\pm 1.5\%rdg \pm 2dgt$ [50/60Hz] $\pm 3\%rdg \pm 4dgt$ [40 - 500Hz] $\pm 5\%rdg \pm 4dgt$ [500Hz - 1kHz] 2000A (1001 - 2000A) $\pm 3\%rdg \pm 2dgt$ [50/60Hz] </td> </tr> <tr> <td data-bbox="209 472 480 506">DC A</td> <td data-bbox="480 472 1241 506">400/2000A $\pm 1.5\%rdg \pm 2dgt$</td> </tr> <tr> <td data-bbox="209 506 480 600">AC V</td> <td data-bbox="480 506 1241 600"> 400/750V $\pm 1.5\%rdg \pm 2dgt$ [50/60Hz] $\pm 1.5\%rdg \pm 4dgt$ [40Hz - 1kHz] </td> </tr> <tr> <td data-bbox="209 600 480 633">DC V</td> <td data-bbox="480 600 1241 633">400/1000V $\pm 1\%rdg \pm 2dgt$</td> </tr> <tr> <td data-bbox="209 633 480 667">Ω</td> <td data-bbox="480 633 1241 667">400/4000Ω $\pm 1.5\%rdg \pm 2dgt$</td> </tr> <tr> <td data-bbox="209 667 480 701">Continuity Buzzer</td> <td data-bbox="480 667 1241 701">buzzer sounds below $50 \pm 35\Omega$</td> </tr> <tr> <td data-bbox="209 701 480 734">Conductor Size</td> <td data-bbox="480 701 1241 734">$\varnothing 55mm$ max.</td> </tr> <tr> <td data-bbox="209 734 480 768">Frequency response</td> <td data-bbox="480 734 1241 768">40Hz - 1kHz</td> </tr> <tr> <td data-bbox="209 768 480 862">Output</td> <td data-bbox="480 768 1241 862"> Recorder : DC400mV against AC/DC400A DC200mV against AC/DC2000A </td> </tr> <tr> <td data-bbox="209 862 480 956">Safety Standard</td> <td data-bbox="480 862 1241 956"> IEC 61010-1 CAT IV 600V , CAT III 1000V IEC 61010-031 IEC 61010-2-032 </td> </tr> <tr> <td data-bbox="209 956 480 990">Power Source</td> <td data-bbox="480 956 1241 990">R6 (AA) (1.5V) $\times 2$</td> </tr> <tr> <td data-bbox="209 990 480 1023">Dimensions</td> <td data-bbox="480 990 1241 1023">250(L) \times 105(W) \times 49(D)mm</td> </tr> <tr> <td data-bbox="209 1023 480 1057">Weight</td> <td data-bbox="480 1023 1241 1057">530g approx.</td> </tr> <tr> <td data-bbox="209 1057 480 1086">Included Accessories</td> <td data-bbox="480 1057 1241 1086">Test leads, Carrying Case, R6 (AA) $\times 2$ & Instruction Manual</td> </tr> </table>	Features	<ul style="list-style-type: none"> • Equipped to measure both AC and DC current with transformer jaws of large diameter. • Can measure AC and DC currents up to 2000A. • Output terminal for connection to recorders. 	AC A	400A/2000A (0 - 1000A) $\pm 1.5\%rdg \pm 2dgt$ [50/60Hz] $\pm 3\%rdg \pm 4dgt$ [40 - 500Hz] $\pm 5\%rdg \pm 4dgt$ [500Hz - 1kHz] 2000A (1001 - 2000A) $\pm 3\%rdg \pm 2dgt$ [50/60Hz]	DC A	400/2000A $\pm 1.5\%rdg \pm 2dgt$	AC V	400/750V $\pm 1.5\%rdg \pm 2dgt$ [50/60Hz] $\pm 1.5\%rdg \pm 4dgt$ [40Hz - 1kHz]	DC V	400/1000V $\pm 1\%rdg \pm 2dgt$	Ω	400/4000 Ω $\pm 1.5\%rdg \pm 2dgt$	Continuity Buzzer	buzzer sounds below $50 \pm 35\Omega$	Conductor Size	$\varnothing 55mm$ max.	Frequency response	40Hz - 1kHz	Output	Recorder : DC400mV against AC/DC400A DC200mV against AC/DC2000A	Safety Standard	IEC 61010-1 CAT IV 600V , CAT III 1000V IEC 61010-031 IEC 61010-2-032	Power Source	R6 (AA) (1.5V) $\times 2$	Dimensions	250(L) \times 105(W) \times 49(D)mm	Weight	530g approx.	Included Accessories	Test leads, Carrying Case, R6 (AA) $\times 2$ & Instruction Manual	01
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12	<p>Auto Transformer</p> <table border="1" data-bbox="252 197 1281 409"> <tr> <td colspan="2" data-bbox="252 197 1281 253">Single phase Input Voltage 0-240 V AC, 50 Hz. Output 0- 270 V AC</td> </tr> <tr> <td data-bbox="252 253 560 353">Type</td> <td data-bbox="560 253 1281 353">Air cooled Portable Closed type</td> </tr> <tr> <td data-bbox="252 353 560 409">Rating</td> <td data-bbox="560 353 1281 409">15 Amp</td> </tr> </table>	Single phase Input Voltage 0-240 V AC, 50 Hz. Output 0- 270 V AC		Type	Air cooled Portable Closed type	Rating	15 Amp	01														
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15	<p>Soldering/ BGA Rework Station</p> <table border="1"> <tr><td>Frequency</td><td>50Hz</td></tr> <tr><td>PCB Size</td><td>Max 410x370 mm,Min 22x22 mm</td></tr> <tr><td>Total Power</td><td>4800W</td></tr> <tr><td>Voltage</td><td>AC220V</td></tr> <tr><td>USB Port</td><td>2</td></tr> <tr><td>Screen Size</td><td>7 Inch</td></tr> <tr><td>Top Heater</td><td>800W</td></tr> <tr><td>Bottom Heater</td><td>2nd 1200W,3rd IR heater 2800W</td></tr> <tr><td>Temperature Accuracy</td><td>+/- 2 Degree C</td></tr> <tr><td>BGA Chip</td><td>2x2 - 80x80 mm</td></tr> <tr><td>Minimum Chip Spacing</td><td>0.15mm</td></tr> <tr><td>External Temper Sensor</td><td>1pc</td></tr> <tr><td>Dimensions</td><td>570 x 610 x 570mm</td></tr> <tr><td>Net Weight</td><td>33 Kg</td></tr> <tr> <td>Feature</td> <td> <ul style="list-style-type: none"> • Embedded industrial PC. • HD touch screen interface, • Digital system setting with human-machine interface operation. • Multi-functional integrated control. • Real-time actual temperature and temperature curve setting can also be used to analyse and correct the curve if necessary. • Uses high precise K-type thermocouple closed-loop control and PID automatic temperature compensation system, with temperature module and intelligent control unit to enable precise temperature deviation on ±2 • Movable universal fixture prevent PCB from damaged on fringe component, suitable for all kinds of PCB repairing. • With different size of magnet nozzles, easy replace and install, rotate freely 360°, any size can be custom if need. Titanium alloy material, does not deform or rust. • Heating temperature, time, slope, cooling and vacuum can all be set in touch screen conversational interface. • 6-8 segments temperature can be set for top heating and lower heating(up to 16 segments). • 50,000 groups of temperature curves can be stored. • Powerful cross flow fan, fast cooling for PCB and machine. • With Voice warning 5-10 seconds before heating finish. • LED light. • Overheat guarding. • Audio-Visual indication. • CE certified. • ISO 9001 standards compliance. </td> </tr> </table>	Frequency	50Hz	PCB Size	Max 410x370 mm,Min 22x22 mm	Total Power	4800W	Voltage	AC220V	USB Port	2	Screen Size	7 Inch	Top Heater	800W	Bottom Heater	2nd 1200W,3rd IR heater 2800W	Temperature Accuracy	+/- 2 Degree C	BGA Chip	2x2 - 80x80 mm	Minimum Chip Spacing	0.15mm	External Temper Sensor	1pc	Dimensions	570 x 610 x 570mm	Net Weight	33 Kg	Feature	<ul style="list-style-type: none"> • Embedded industrial PC. • HD touch screen interface, • Digital system setting with human-machine interface operation. • Multi-functional integrated control. • Real-time actual temperature and temperature curve setting can also be used to analyse and correct the curve if necessary. • Uses high precise K-type thermocouple closed-loop control and PID automatic temperature compensation system, with temperature module and intelligent control unit to enable precise temperature deviation on ±2 • Movable universal fixture prevent PCB from damaged on fringe component, suitable for all kinds of PCB repairing. • With different size of magnet nozzles, easy replace and install, rotate freely 360°, any size can be custom if need. Titanium alloy material, does not deform or rust. • Heating temperature, time, slope, cooling and vacuum can all be set in touch screen conversational interface. • 6-8 segments temperature can be set for top heating and lower heating(up to 16 segments). • 50,000 groups of temperature curves can be stored. • Powerful cross flow fan, fast cooling for PCB and machine. • With Voice warning 5-10 seconds before heating finish. • LED light. • Overheat guarding. • Audio-Visual indication. • CE certified. • ISO 9001 standards compliance. 	01
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