INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

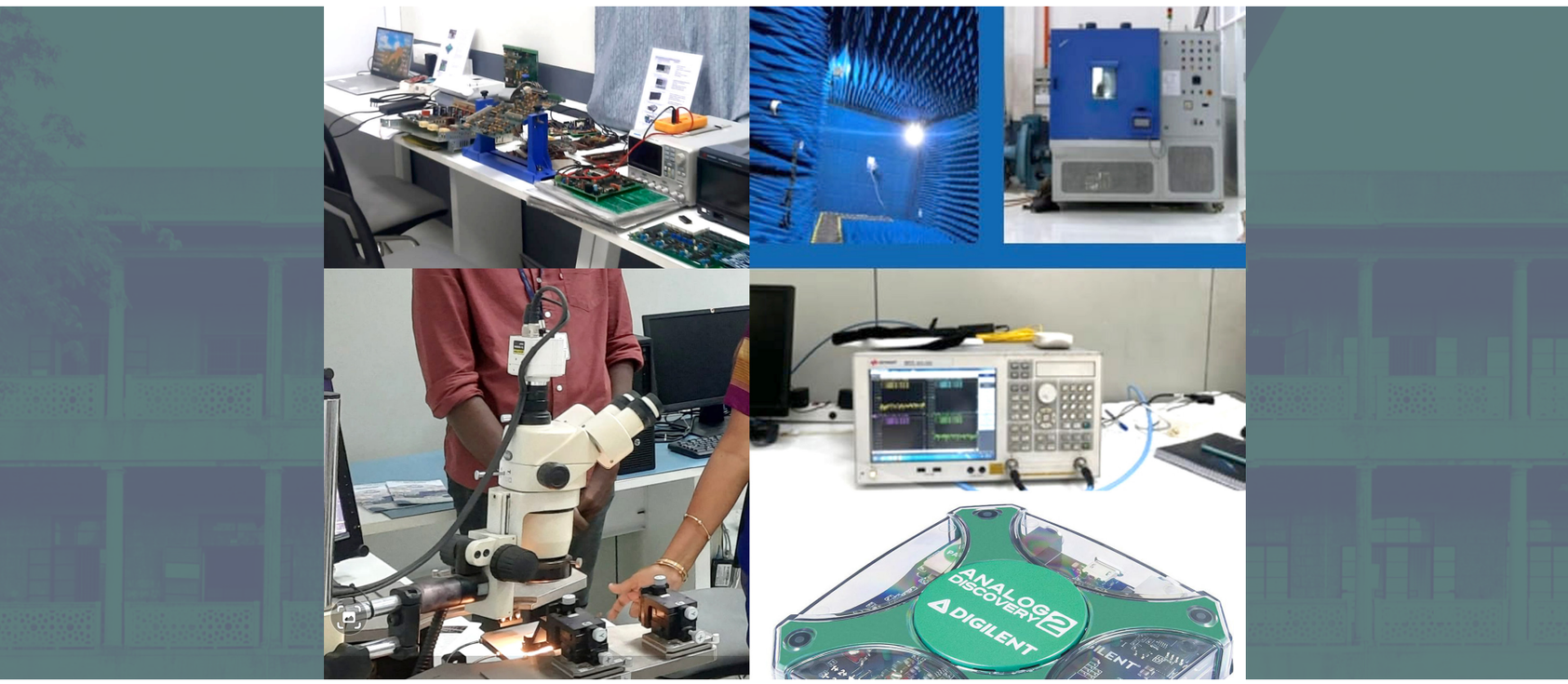
Thiagarajar College of Engineering

where quality and ethics matter

67 YEARS 1957-2024 *Celebrating Academic Excellence*

CEEPT

CENTRE OF EXCELLENCE IN ELECTRONIC PRODUCT TESTING



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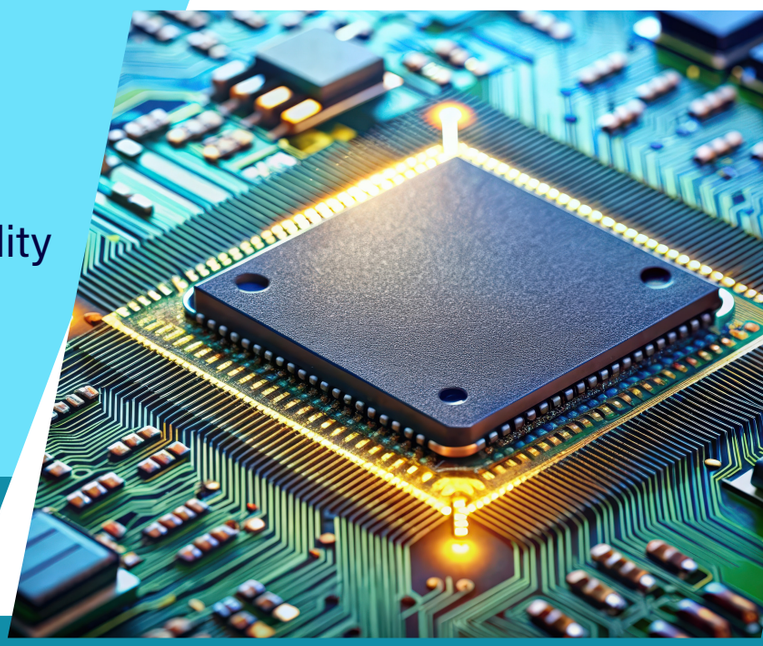
The centre of Excellence in Electronic Product Testing (CEEPT) is dedicated to serve as a hub for testing of electronic hardware products across a board frequency range, catering to wireless and defence industries. CEEPT has a well-established laboratories providing testing facility for Electronic PCB products and antennas as detailed below.

- Mixed Signal board validation
- Embedded board testing
- Communication test benches
- RF component testing
- Anechoic chamber for Antenna testing facility
- Image processing based PCB inspection
- Product reliability testing



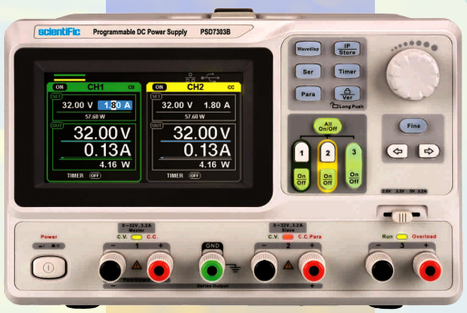
CEEPT Offers

- Workshop and upskilling programmes to government, private R&D organizations and educational institutes at the national and International levels, Industry people in the fields of advanced test engineering
- Basic, Intermediate and Advance training in Electronic Hardware Testing
- Support to start-ups, MSME and incubatees in product testing and upskilling
- Short term Training courses to students to enhance their employability levels and upgrade their skill sets in Electronic product testing
- Certificate courses for internal and external students in collaboration with industries.

Mixed Signal Board Validation

- InfiniiVision 2000 X-Series
- 70 MHz oscilloscope
- 2 analog channels and 8 integrated digital channels, 100 kpts memory, 200,000 waveforms/sec update rate
- Protocol analyzing

Digital Programmable DC Power Supply, Scientific, PSD7303B



- 3 independent controlled and isolated output, 32V/3.2A×2, 2.5V/3.3V/5V/3.2A×1,Power 220W
- 4 digits Voltage, 3 digits Current Display
- Minimum voltage Resolution:10mV
- Minimum Current Resolution:10mA

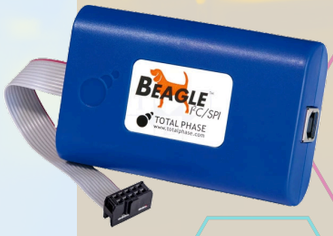
Digital Multi meter, Keysight, EDU34450A

- DCV, DCI, True RMS ACV, ACI, 2- and 4-wire resistance, frequency, continuity, diode test, capacitance, and temperature
- Basic DCV accuracy of 0.015% for 1 V – 100 mV:
- Up to 5,000 points data-logging memory
- USB and LAN interface support

Debugger,Segger, J Take Emulator8.08.00

- ARM debugger
- NXP and STM32 debugging
- Supported with Cube IDE and Keil

Protocol Analyzer, Beagle , USB12



- Non-intrusively monitor I2C up to 4 MHz
- Non-intrusively monitor SPI up to 24 MHz
- Bit-level timing down to 20 ns resolution

Embedded Board Testing

Nvidia Jetson Nano Developer kit, GPIO UART

- Quad-core ARM Cortex-A57 MPCore processor
- 4 GB 64-bit LPDDR4, 1600MHz 25.6 GB/s
- 16 GB eMMC 5.1

FMCW Radar Boards, Texas Instruments, IWR6843ISK

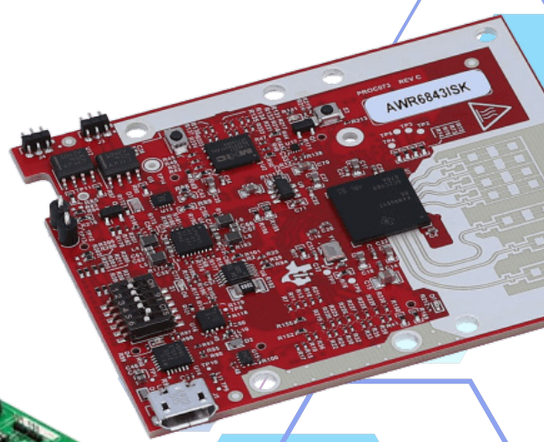
- mmWave, FMCW Radar 77 to 81 GHz, 150 Meter Range
- Onboard antenna enables field testing
- XDS110-based JTAG with serial-port interface for flash programming
- UART-to-USB interface for control, configuration, and data visualization
- TI LaunchPad development-kit interface to seamlessly connect to TI MCUs
- CAN connector enables direct interface to car units

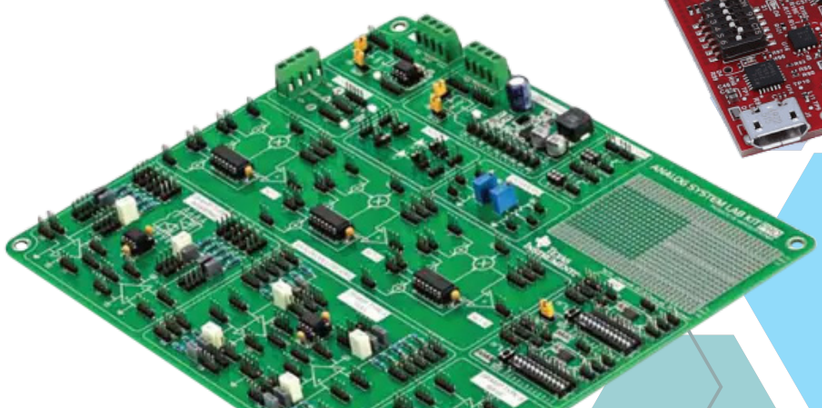
PC based scope(Analog Discovery), Digilnet, 410-321

- Channels: 2,Channel type: differential Resolution: 14-bit,Absolute
- Resolution (scale ≤0.5V/div): 0.32mV
- Absolute Resolution (scale≥1V/div): 3.58mV,Accuracy (scale≤0.5V/div, VinCM = 0V):±10mV±0.5%
- Accuracy (scale≥1V/div, VinCM = 0V):
- ±100mV±0.5%, CMMR (typical): ±0.5%
- Sample rate (real time): 100 MS/s
- Input impedance: 1MΩ||24pF, Scope scales: 500uV to 5V/div
- Analog bandwidth with Discovery BNC adapter: 30+ MHz @ 3dB, 10 MHz @ 0.5dB, 5 MHz @ 0.1dB, Analog bandwidth with included flywires: 9 MHz @ 3dB, 2.9 MHz @ 0.5dB, 0.8 MHz @ 0.1dB

Texas Instrument Analog System Education

- In built analog susb system to test analog circuit
- Ac signal and DC signal testing feature
- Gain test and open loop gain test
- Inbuilt analog Multipliers for Filter test





EMG Data Acquisition

EMG Data Acquisition and Low-cost EMG sensor validation, Delsys Trign Wireless EMG System and LabChart Licenced Software

- EMG Data Acquisition and Validation system
- Validation of low cost EMG sensors
- Record electrical muscle activity for research in Human Machine Interface, Physical therapy, Rehabilitation sciences, Sports science and Ergonomics.

RF System Testing and Validation

Cascade EP6 Probe station

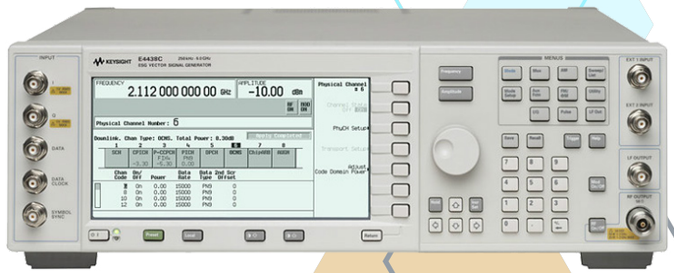
- Ideal for a wide range of applications such as RF, mm-Wave and sub-THz characterization, FA, DWC, MEMS, optoelectronic tests and WL
- Re-configurable and upgradable as requirements grow
- Minimizes setup times with no loss in performance or accuracy
- Seamless integration of various measurement instruments

2Channel Infinium Oscilloscope Agilent , (1GHz)

- Integrated 2 scope and 16 timing channels
- 1 GHz bandwidth
- Up to 4 GSa/s sample rate
- Up to 128 Mpts optional memory, also available as after-purchase upgrades
- Standard 4 Mpts memory
- Simple, analog-like front panel with Windows® GUI
- Time correlation option for the
- 16900/16700/1680/1690 series logic analyzer and scope
- Web-enabled remote control and email on trigger

ESG Vector Signal Generator, Agilent E4438C, 250KHz - 1GHz

- 250 kHz to 1GHz (0.01 Hz resolution)
- +17 dBm output power
- 160 MHz RF modulation bandwidth
- AM, FM, PM, and pulse
- ASK, FSK, MSK, PSK, QAM, custom I/Q
- Step, or list, frequency and power
- Internal baseband generator (80 MHz RF BW): arbitrary waveform and real-time I/Q



Vector Network Analyzer, Tektronix TTR503A

- 100 kHz to 3 GHz frequency range
- 122 dB dynamic range
- -50 to +7 dBm output power
- < 0.008 dB RMS trace noise

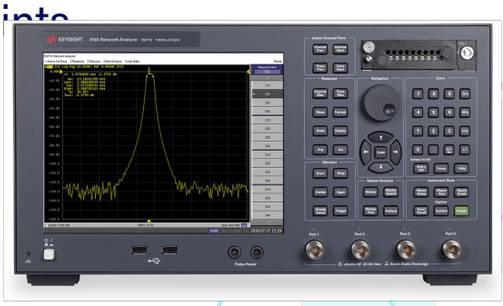
Antenna testing and Anechoic chamber facility

Antenna Testing Chamber Facility 800MHz – 20GHz

- High-performance RF shielding up to 20GHz
- Shielding effectiveness of >100bB
- Multi-axis positioner made of low dielectric material for uncompromised measurements
- Heavy duty positioners for antenna load of 40Kg and above.
- High Precision Positioners with up to 0.1 degree resolution

Chamber Dimension	**8m×4m×4m**
Frequency Range	**800MHZ to 18GHz**
Attenuation	**>90dB over the band 1GHz to 18GHz**
Quiet Zone size	**1.8m**
Reflection Requirement in QZ	**-40dB**
Ripple Requirement at the QZ edge	**<±0.5**
Test Range	**2.5 to 3m**
Near field or far field testing	**Far field Testing**

ENA Series Network Analyzer, Keysight E5071C, 300KHz – 20GHz



- Wide dynamic range: > 123 dB dynamic range at test port (typical)
- Fast measurement speed: 41 ms @ full 2-port cal, 1601 points
- Low trace noise: 0.004 dB rms @ 70 kHz IFBW
- Integrated S-parameter test set
- Port options: 2-port and 4-port
- Balanced measurements (4-port option)
- Frequency options: 300 kHz - 20 GHz

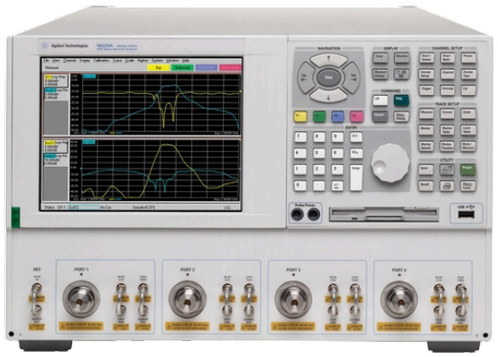
Spectrum Analyzer, Agilent E4407B,9KHz-26.5GHz

- 9KHz - 26.5GHz frequency range, 10MHz analysis bandwidth
- -148dBm noise floor
- 4 dB overall amplitude accuracy
- Low phase noise and wide dynamic range
- Precision time base and 1 Hz counter resolution
- Segmented sweep for up to 32 discontinuous spans in one sweep
- Rugged and portable for lab grade performance in the field
- 5-minute warm-up to guaranteed measurement accuracy

Signal Generator, ROHDE&SCHWARZ SMR 20, 10MHz - 20GHz

- Max frequency: 20 GHz
- Minimum Frequency: 10 MHz with opt B11
- Modulation: AM FM Pulse
- Max. Output level: 13 dBm
- Min. output level: -20 dBm or -130 with opt B17
- Resolution: 1 kHz or 0.1 Hz with opt B3

Advanced Measurement & report generation software – TEKPAT

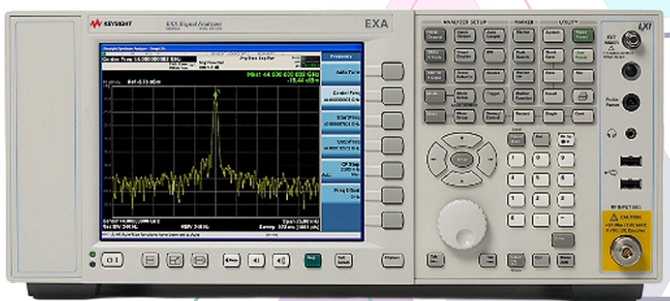


- Active and passive device measurement
- 2D/3D radiation pattern measurement
- Measure EIRP, Gain, Efficiency, etc
- Measure Directivity, HPBW, Field strength, etc
- Pre-certification and device verification
- Advanced software with tight hardware integration
- High-resolution measurement – 0.25deg
- Integration with switch matrix for smart antenna measurement
- Compatible with renowned VNA

Vector Network Analyzer, Agilent N5230A, 300KHz – 6GHz

- High dynamic range: 127 dB at 20 GHz at test port
- Low trace noise: 0.002 dB rms at 1 kHz bandwidth
- Fast measurement speed: 4.5 to 26 µsec/point High stability: 0.05 dB/degrees Celsius
- State-of-the-art calibration capabilities and wide-range of ECal modules
- Advanced applications for mixer and pulse measurements
- Single-ended and balanced measurements
- 32 measurement channels, unlimited traces, and 16,001 points per channel
- Connectivity with Open Windows XP, 6 USB connectors, LAN, and GPIB

EXA-Signal Analyzer, Keysight N9010A 10Hz –26.5GHz



- Operating range: 10 Hz to 26.5 GHz
- Analysis bandwidth: 40 MHz
- Phase Noise: -102 dBc/Hz @10 kHz Offset
- Displayed Average Noise Level (DANL): -163 dBm
- Amplitude Accuracy: ± 0.27 dB
- Windows 10 operating system

LCR meter, Keysight E4980EL

- 20 Hz to 300 kHz/500 kHz/1 MHz, with 4-digit resolution in any range
- 0.05% basic accuracy with superior measurement repeatability at low and high impedance
- 100 uV to 2 Vrms, 1 uA to 20 mA variable test signal
- DC bias 1.5/2 V
- Auto-level control
- DC resistance
- 201 points list sweep

S Band Signal Source, GB Tech GB3091

- 2 GHz – 3 GHz
- Accuracy +/- 500 MHz
- Operating Modes – Sweep mode, CW Mode, Internal AM, Internal FM, External AM/FM

Spectrum Analyzer, Tektronix RSA306B

- 9 KHz to 6.2 GHz frequency range covers a broad range of analysis needs.
- +20 dbm to -160 dbm measurement range.
- Fast sweeps (2 per second) over entire 6.2 GHz
- span for quick detection of unknown signals.
- Acquisition bandwidth of 40 MHz enables wideband vector analysis of modern standards.
- Minimum signal duration 15 µ sec captured with 100% probability of intercept.

USRP wireless communication Test Bench (Transmission and Reception, Wireless Transmission and Reception using with Loopback Cable)

Transmitter

- Frequency Range 50 MHz to 2.2 GHz,step<1 kHz
- Maximum instantaneous real-time
- 16-bit sample width 20 MHz
- 8-bit sample width 40 MHz
- Maximum I/Q sample rate bandwidth
- 16-bit sample width 25 MS/s
- 8-bit sample width 50 MS/s
- Digital-to-analog converter (DAC), 2 channels, 400 MS/s, 16 bit

Receiver

- Frequency range 50 MHz to 2.2 GHz
- Frequency step <1 kHz
- Maximum instantaneous real-time bandwidth, 16-bit sample width20 MHz
- Maximum I/Q sample rate
- 16-bit sample width 25 MS/s
- 8-bit sample width 50 MS/s
- Analog-to-digital converter (ADC), 2 channels, 100 MS/s, 14 bit
- Power (Total power, typical operation)
- Typical 12W to 15W, Max 18 W